

GROUNDWORK
OR
PSYCHOLOGY

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THE GROUNDWORK OF PSYCHOLOGY

BY

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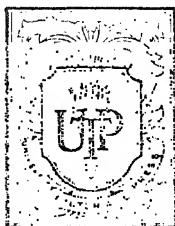
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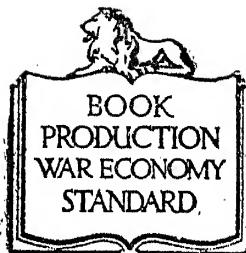
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PREFACE TO THE SECOND EDITION.

It is much to be regretted that the pressure of other work has made it impossible for Professor Stout to undertake the radical revision of this work which he has for many years contemplated. Revision has become necessary as a result of the general advance in psychology through the experimental and other work of the twenty-four years since the book was first published, and the task has fallen on me. Since this work was to be done by another hand than that of the author, it seemed better not to attempt a thorough-going rewriting of the book. This could not have been satisfactorily done by anyone but Professor Stout himself. Nor did it seem desirable that I should alter Professor Stout's text when, in matters that are still in dispute amongst psychologists, I happened to find myself in disagreement with him. I have confined myself, therefore, to rewriting those sections of the book in which more recent work has thrown fresh light on the problems dealt with by Professor Stout.

Apart from the passages which have been added or entirely rewritten, I have made only a few unimportant alterations in the remainder, and to these changes Professor Stout has agreed. This part of the text, therefore, remains Professor Stout's. The responsibility for the new and altered parts of the work is, on the other hand, my own. These parts are : the Chapters on Attention and Instinct (Chaps. VI. and

XVIII.), the section at the end of Chapter IV. on “ Evidence of Correlation from Physical Injury and Disease of the Brain,” and the whole of Chapter IX., with the exception of the last section on “ The Embodied Self.”

I am very much indebted to Dr. Shepherd Dawson, who very kindly read through my additions and alterations and helped me by many acute criticisms. Professor Stout, too, has given me generous encouragement in this work and has helped me by commenting on what I had written. I take this opportunity of recording my gratitude to both.

R. H. THOULESS.

CAMBRIDGE.

NOTE TO THIRD EDITION.

In the third edition a new chapter has been added, supplementary to Professor Stout’s chapter on the Emotions, and taking the place of the former chapter XVI., which was contributed by the late A. F. Shand, whose work on the psychology of the Emotions may now be consulted in his book on *The Foundations of Character*. The concluding Chapter XX. is also new, and gives, for the information of those who intend to pursue the study of the subject, a brief survey of Professor Stout’s other writings on psychological topics. The opening sections of Chapter I. have been revised in order to simplify this introductory matter for those who are approaching the subject for the first time ; and a number of the references to other books have been brought to the present editions.

S. H. MELLONE.

EDINBURGH.

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THE GROUNDWORK OF PSYCHOLOGY.

CHAPTER I.

THE SUBJECT-MATTER OF PSYCHOLOGY.

The Psychological Point of View.—Psychology may provisionally be defined as a reasoned scientific account of the processes in which mental life consists. We may remark in passing that the words “mental” and “psychical” are equivalent, the former being of Latin and the latter of Greek origin. The definition, however, requires to be made more precise. Mental processes do not float about in the air; they always form part of some individual mind in the most intimate connection with a particular living body related through its sense-organs to a surrounding world, and related in various ways to other embodied minds in a particular society or community. It is impossible for Psychology to ignore either of these connections. Some of their most important consequences will be discussed in the sequel. In the meantime their general nature enables us to define the psychological point of view.

(a) Consider the following expressions: “I am attending to what you say”; “I want to know whether it is so or not”; “I doubt it”; “I hope so”; “I fear he has failed”; “That is what I desire”; “I remember seeing it last year”; “I am very interested in it”; “I see a cloud of dust”; “I believe it”; “I know it to be so as a matter of fact”. Each of these expressions implies (1) a certain process, and (2) something to which the process refers or relates. In the cases mentioned, the various processes are—attending, questioning, doubting, hoping, fearing, desiring, remembering, being interested, perceiving, believing, knowing. All those

processes are mental, and have their source in or form part of the life of a mind. But in addition, these expressions imply *something which is attended to, doubted, feared, etc.* In each case this something may be called the *object* of the mental process, and the mental process, in its contrast and relation to the object, may be called *subjective*. There is no difficulty in seeing the distinction between a mental process and its object ; and the mental process has characteristics of its own apart from its object. In some cases the distinction is peculiarly obvious. I may be in a questioning attitude of mind about the length of a room ; but the room, the object, is not in a questioning state ; it is I who am in doubt about it. Such modes of statement imply that the primary interest is in the object rather than in the mental process itself or "as such."

(b) Consider, next, such questions as the following : "Are you *sure*?" "Why did you do that?" "Did you do it on impulse or after thinking about it?" "Tell me how you reasoned this out." "Do you feel better?" "How many times did you have to repeat this list of dates before you knew it perfectly?" "Why does this remind you of something unpleasant?" Such expressions indicate that the primary interest is in the mental process on its own account. When we begin to be interested in the mental process "on its own account," we begin to be in the attitude which the psychologist adopts in the study of mental life.

(c) Not yet, however, are we in the psychological attitude in the stricter scientific sense of the word. For in all such cases as those that we have mentioned, where the reference is understood to be to a particular person in particular circumstances, the mental processes referred to may be complicated with mere personal peculiarities. As psychologists we desire to penetrate through these special characteristics to a conception of the conditions and nature of the mental process which shall be true of all normal minds. Nevertheless it remains true that a mental process is a process forming part of the life-history of some experiencing individual. It is always some one's experience ; and it exists only while it is being actually experienced.

I experience the sensation of yellow. When I turn away and think of something else, the sensation ceases to exist in ceasing to be experienced. The orange, on the contrary, continues unchanged when I no longer look at it. There is a physical property of the orange which is the condition of it giving me a yellow sensation. This is the property of reflecting only those rays of light which belong to the part of the spectrum extending from the red end to about the middle of the green, while its surface absorbs the other constituents of white light. If we call this physical property the yellowness of the orange, then yellowness as a quality of the orange is not a psychical state.

Psychical Process and its Object.—The terms “subject” and “object,” “subjective” and “objective,” are employed in philosophical and other discussions in various senses, and sometimes result in confusion. But the terms are required in psychology to express the relation which we have already illustrated, and which is unique and ultimate and cannot be formally defined. We shall use the terms only in this way.

We have now to see that not all mental processes are subjective in the psychological sense. Sensations in general, so far as they enter into the relation of subject and object at all, fall to the side of the object, and not to that of the subject. When I listen to the sound of a bell, the act of listening is subjective. But the sensation of sound is my object. I attend to it. I discriminate it from other simultaneous sounds, and perhaps compare it with these. I refer it to the bell as its cause. I note or attempt to note its quality, its degree of loudness, its duration. I like or dislike it. It is essentially an object in relation to these subjective processes of attending, discriminating, comparing, etc. The same holds good of sensations in general, as those of sight, pressure, taste, and smell. They are all psychical states. They actually exist only while they are being actually experienced. But so far as they enter into the relation of subject and object at all, they are psychologically objective and not subjective.

A sensation, as distinguished from other modes of knowledge, may be described as the simplest possible kind of “knowing,”

—the immediate consciousness of a comparatively simple quality, as mentioned above ; and the psychologist is concerned with the nature of sensations “as such.” He has to distinguish their varieties, classify them, investigate their qualitative affinities and relations, and inquire into the conditions of their production. If he investigated *spatial* relations in this way, he would cease to be a psychologist and become a geometricalian ; but all that can be known about sensations it is the business of the psychologist to know.

Sensations are not the only immediate experiences which are psychologically objective. “We have to bring under the same head those revivals or copies of sensuous experience which are called mental ‘images.’ At this moment I can call up the mental picture of a horse although no horse is present to my senses so as to be actually seen. In like manner I can command experiences resembling previous sensations of sound or touch without actually hearing or touching. Such revivals of sensation are immediately experienced in the same way as the sensations themselves, and they have the same title to be regarded as psychologically objective. They are not subjective states of attending, liking, disliking, etc., but objects attended to, liked, or disliked. And we have strong reasons for affirming that there are other objects of this kind beside sensations and those which are ordinarily called ‘images.’ ”¹

How Psychology is concerned with extra-mental objects.——We have used the words “object” and “objective” in the strict psychological sense, illustrated above ; but psychology cannot ignore “objects” in the wider sense of what really exists or is true in contrast to what *appears* to this or that individual. At first sight it may appear that the two meanings of the term object,—(1) as what appears to some experiencing mind, and (2) as what exists and has a nature of its own independently of its appearance,—are mutually exclusive. But they are in fact essentially related. An object which *appears* to this or that individual may be inadequately apprehended ; it may seem in various ways other

¹Stout, *Manual of Psychology*, Introduction, pp. 7-8.

than what it really is. But in all appearance, something real appears. Even fiction consists in thinking of realities as in various ways modified or transformed. The same is true of errors or mistakes ; " we cannot think of a thing wrongly if we do not think of it at all."

Thus, as we shall see, a sensation is part of the total object which is before the mind when we perceive something by the eye or ear or other sense-organ ; it is an immediate experience due to the change set up in the sense-organs by the agency of the external object and thence transmitted to the brain. How, then, is psychology concerned with " objects " in this wider sense ?

The essential point is that psychology considers objects only in their relation to an experiencing mind. An object of cognitive process interests the psychologist only in so far as somebody knows it, or comes to know it, or attempts to know it, or forgets it, or remembers it, or fails to remember it, and so on. An object of volition interests the psychologist only in so far as some one wills it, or comes to will it, or ceases to will it, etc. His interest in the object known or willed is conditioned by his interest in the processes of knowing and willing.

Thus he has no direct concern with the constitution and laws of the external world. But it is his especial business to exhibit the process through which such a world comes to be presented to the individual consciousness. He has no direct concern with the spatial relations. But it is part of his task to show how the young child becomes aware of such relations. He is not called upon to define the real distinction between right and wrong, or to determine the answer to any properly ethical question ; but it belongs to his business as a psychologist to show how the individual comes to make a distinction between what is morally right and what is morally wrong.

Nature of the " Subject."—There is one thorny question which we have so far evaded. We have spoken freely of subjective processes ; but we have not discussed the nature of the subject whose processes they are. Yet it seems evident that attending implies some one who attends, that desiring

implies some one who desires, and so on. Sensations also, though they are not subjective states, are states of a subject. They exist only in being experienced by some one.

What has the psychologist to say concerning this some one who *owns* all the psychical states which are referred to one and the same mind? On one point there is general agreement. The psychical states belonging to the same subject are connected with each other in an altogether peculiar way so as to form a unity of a unique kind. But here there is a divergence of opinion. Some maintain that the term "subject" is merely a name for the unified system of psychical processes, actual and possible, present, past, and future. On this view, when we say that a desire is some one's desire, we merely mean that it forms part of a certain connected totality of conscious experiences. Others regard the subject not as identical with the unified experience, but as a ground of union, a unifying principle. It is supposed to be something which persists through its varying states and binds them together.

As psychologists we are not bound to decide in favour of either of these opposing doctrines. For, as psychologists, our concern is with psychical states and processes, and the unifying principle, if it exists, can only be known to us in and through the unity and continuity of conscious life, which it makes possible. We have no independent knowledge of it which could be of assistance to us in our special line of inquiry. The student of physical science is in a similar position as regards the problem of the thing and its qualities. He can do his work quite well without ever inquiring whether a material thing is simply the total complex of what are called its attributes, or a connecting principle which binds these attributes together. We need not attempt to determine what is ultimately implied in the use of the term "subject," just as the chemist or physicist need not attempt to determine what is ultimately implied in the use of the term "thing."

What we have to investigate is the unity and continuity of the individual consciousness in its various forms, phases, and stages of development.

In this investigation there is one principle never to be lost sight of. The unity of the subject is inseparably correlated

with the unity of its object as such. As typical examples of the unity of consciousness we may take the connection of a desire and its gratification, or that of asking a question and finding or receiving an answer. The continuity of desire and its gratification implies that what is obtained is identified with what was desired. Similarly the question which is answered must be identified with the question which was asked. In general, psychical process is one and continuous only in virtue of the recognised identity of its object. I am one in so far as my world is one.

Conditions of Psychical Process.—We come now to the third of the questions with which we started. Psychology investigates the conditions of the occurrence of psychical states. What are these?

In part they are themselves psychical. They fall within the process of consciousness itself. Conscious life is a development in which preceding stages form the basis and presupposition of succeeding stages. But this internal development is not self-supporting. It requires a multitude of contributory conditions which are not themselves psychical states or processes. The flow of individual consciousness is closely connected with and constantly dependent on a particular bodily organism with its organs of sense and movement. The psychologist cannot give a systematic account of psychical process without reference to these bodily conditions. He is also compelled at every step to recognise the existence of what are called psychical or mental *dispositions*, inherited and acquired.

Thus our actual experience at any moment is determined by conditions which are not themselves actual experience, but the abiding after-effects left behind by prior experiences. I recognise a man to-day because I met him yesterday, although I may not have thought of him in the interval. This can only be because my experience of yesterday has left behind an after-effect which has persisted through the intervening time and now determines my present experience. This residual after-effect is an acquired disposition.

Again, what are called in ordinary language friendship and enmity are acquired dispositions of a complex character rather

than actual psychical processes. Friendship involves such actual psychical processes as being glad at a person's prosperity, grieved at his misfortune, rejoiced to meet him, sorry to part from him, and so on. But these psychical states are merely partial and transient manifestations of the permanent friendly disposition. This is the abiding condition of these varying phases of actual emotion.

Such friendships or enmities to particular persons are examples of the acquired dispositions which are now usually called "sentiments." Those dispositions, on the other hand, which are inborn and which are common to all men are generally called "instincts." In a certain sense a man's instincts are the foundation on which his sentiments are built. The specific capacities which are also inborn, but which differ from individual to individual (such as the musical capacity of a Mozart) are also inherited dispositions.

There are three ways in which dispositions may be regarded by the psychologist. Primarily he knows them by the manner in which they operate in determining psychical process. It is from this point of view that he is led in the first instance to *posit* their existence at all. So regarded, they are merely permanent possibilities of psychical process. But of course they must in reality be more than this. A naked possibility is nothing. A possibility must be founded in the constitution of actual existence. What kind of actual existence does a psychical disposition possess? It is sometimes said to be an unconscious state, or modification of the subject, and the subject considered as the possessor of such unconscious states or modifications is called a soul.

Against this I have nothing to say. It may well be nearer to the ultimate truth than any other statement. But to the psychologist the conception of a soul is not helpful. He has no independent means of knowing anything about it which could be useful to him. For him the term "soul" is virtually only another name for the total system of psychical dispositions and psychical processes.

CHAPTER II.

METHOD AND SOURCES OF DATA.

Method of Psychology.—The business of Psychology is to furnish a systematic and coherent account of the flow of psychical process in its various forms, phases, and stages, and of the conditions on which it depends. This involves description, generalisation, and explanation.

Description in the case of complex process includes analysis. The elementary constituents of the complex process must be discriminated and their form of combination assigned. In dealing with constituents which are too simple to admit of further analysis, we must at least take care so to characterise them as to avoid ambiguity. We must point them out in such a manner that they will not be confused with anything else. This kind of pointing is illustrated by the mode in which I have attempted to indicate what is meant by a subjective process.

Analysis sometimes discriminates items *A* and *B* which are really separable, so that *A* is capable of existing in the absence of *B*, and *B* in the absence of *A*. Thus the total process of learning a list of dates includes the several acts of learning each separate date, and each of these could take place without the others. Sometimes *A* and *B* may be only distinguishable, but not separable. Thus pleasure and pain and the degree of intensity which belongs to them are indivisible ; and the same holds good of the act of believing and the degree of conviction with which the belief is held. Sometimes *A* may be separable from *B* but not *B* from *A*. It is possible to understand the meaning of a proposition without believing it ; but it is not possible to believe it without understanding its meaning.

Generalisation consists in the formulation of uniformities of coexistence and sequence. In psychology it consists in assigning the necessary and sufficient, or at any rate the necessary conditions of the occurrence of the various forms of psychical process. The conditions thus assigned are partly found within the flow of psychical life itself, and partly outside it.

Thus the visual perception of an orange is in part conditioned by the structure and movement of the eye. But the structure and movement of the eye are facts of our bodily organisation, not of our conscious life. On the other hand, the orange could not be perceived as such merely in virtue of ocular sensations. It is necessary that the percipient should have had previous conscious experience in which he has not only seen, but handled, tasted, and smelled oranges. Conditions of this kind are themselves psychical in their nature.

Many rough and ready psychological generalisations are embodied in common proverbs. *E.g.* "The burnt child dreads the fire." "Bullies are cowards." "New brooms sweep clean." "Put a beggar on horseback and he will ride to the devil." "The wish is father to the thought." "Pride goes before a fall."

Explanation consists in showing how general principles operate in relatively special cases, so as to answer the questions, why? or how? Thus on the basis of the general principles of the perception of spatial relations we may explain why the sun looks larger when it is near the horizon, or why the interval between two lines on a printed page appears greater when it is only brighter. Or, starting from the general laws of emotion and sentiment, we may explain why when love gives place to dislike, the dislike is frequently more intense because it was preceded by love.

The power of explanation should involve some power of prediction more or less precise. This power is restricted in psychology because of the extreme complexity of the conditions of the mental life. But it is not absent.

We can, for instance, prove that the exclusive use of certain kindergarten methods in the education of young children will arrest the development of imagination and lower the general

level of intelligence. We can predict that close contact of savages with a civilisation which they cannot assimilate will demoralise them in some respects, if not on the whole. We can predict that a body seen with one eye at a certain distance from the observer will alter its apparent configuration if the distribution of light and shade on its surface is altered in certain ways.

Such examples might be indefinitely multiplied. But it is to be remembered that such prediction is nearly always conditional and liable to exceptions, owing to the presence of factors which counteract those on which the prediction is founded. For instance, we cannot by altering the distribution of light and shade cause a human face to appear concave instead of convex. The ordinary appearance is too familiar and habitual for this to be possible.

Sources of Data.—The sources of psychological data are manifold and diverse. But they can be ultimately grouped under three heads :—

- (1) Introspection, or “ the notice which the mind takes of its own operations ” (Locke).
- (2) Inference from the behaviour of others to their psychical processes.
- (3) The results of previous mental development as supplying a clue to the processes through which they have been reached.

(1) *Introspection* is sometimes called inner perception, and also inner sense. The term “ sense ” in this application is, however, really nonsense. When I perceive a tree, the tree acts on a sense-organ—say the eye—and so gives rise to sensations of colour. When I notice that I am desiring, doubting, impatient, or resentful, these processes do not act on any sense-organ or produce anything analogous to a sensation. My perception of them is not *sense*-perception. But though it is not *sense*-perception, it may be appropriately called perception. Roughly speaking, the essential character of perception is that the actual existence of its object operates as a factor directly determining our cognition of that object.

Thus when I perceive a tree, the tree itself as an actual

existence contributes to determine my cognition of it by acting on my sense-organs, and so giving rise to sensations. This is not so when I merely remember the tree in its absence. Similarly, when I am feeling disappointed and take note of my feeling, the feeling itself as it exists at the moment is a factor determining my apprehension of it. In a mere remembrance of having felt disappointment in the past, this would not be so.

The actual existence and agency of what is perceived at the moment of perception is never the sole factor determining cognition, whether what is perceived be a material thing or a psychical state. Its controlling influence is always blended with that of previous experience and the direction of attention at the moment. What the botanist perceives when he looks at a plant is different from what a child of three would perceive, though both may have virtually the same sensations. The sense presentation is differently interpreted, and different features are noticed. Similarly, what the trained psychologist may perceive when he observes his own anger may be different from what the untrained would discern. Both in observation of material phenomena and of psychical processes, what you find depends on what you bring with you. It depends on the questions you are primed with, and on your explicit or implicit anticipations, assumptions, inferences, or interpretations.

(2) Logically, the knowledge of self has always a certain priority as compared with knowledge of others. We can only interpret manifestations of mind in others on the analogy of our mental processes. But in their actual development, the two kinds of knowledge show the closest interdependence. The growth of self-knowledge and of knowledge of others are virtually two aspects of a single process. It is mainly in the attempt to find out what goes on in other minds that we are led to notice what goes on in our own. Inner observation finds here the most potent motive and its guiding clue.

Further, though in the first instance interpretation of the manifestations of the working of other minds logically presupposes acquaintance with our own, yet the success or failure of the interpretation supplies an all-important means of testing the validity and adequacy of our self-knowledge. The

success or failure of our interpretation is tested by its power to cover all the relevant facts gained by observation and experiment in a coherent and systematic way. If we succeed in giving a coherent and systematic account of the behaviour of young children and animals, this is the best verification we can have of the validity and adequacy of the psychological analysis which forms the basis of our explanation. It is hardly too much to say that while children and animals are mysteries to us, we do not fully understand ourselves.

(3) Mental life is a progressive development in which we come to perceive, imagine, believe, desire, will, love, or hate, objects which were not previously objects of our perception, imagination, belief, desire, or hatred, or love. So far as this gradual growth of the objective content of consciousness is due to psychical processes, proceeding in accordance with general laws, or in a systematic order, it is the business of the psychologist to trace it.

Suppose that we have a series of letters by the same person, beginning at six years old, and continued at weekly intervals until he reaches the age of twenty. We may assume that the letters contain little in the way of direct description of the workings of his own mind. They are, let us say, occupied mainly with things he has seen or heard, things he wants to do or get, expressions of opinion, and of approval and disapproval of what goes on around him.

Any one with a psychological bias, who should read these letters, would naturally attempt to frame a connected view of the course of mental development represented by them. This might be merely biographical. It might be only a more or less systematic representation of the mental history of this particular individual. But the reader of the letters may also attempt to generalise. He may attempt to discover in the particular case before him forms and principles of mental development which apply beyond this particular case. So far as he generalises in this way he has entered upon the province of psychology.

This illustration is drawn from the course of mental development in a single individual. But for psychology the most important data of the kind are results of mental process

common to whole societies, and in some cases to all normal human beings.

For instance, the presentation of a surrounding world of material things and processes is in certain broad features the same for all men. As the great logician, Sigwart, puts it, "We all comprehend and distinguish the same things in the same space and in the same spatial relations, and agree in the way in which we connect our experiences in time, and recognise the same similarities and differences." We know that this world, which is the common possession of normal adults, does not exist for the consciousness of the young child. The young child shows an extremely vague apprehension of spatial relations and a still vaguer apprehension of time relations. His apprehension of a world ordered in space and time, such as we ourselves have cognisance of, comes as the result of a long and complex series of psychical processes, and it therefore constitutes a psychological problem. But the existence and nature of the result, the fact that we do now all apprehend a world so constituted, forms an indispensable datum from which the psychologist starts, and to which he must constantly return in order to test his hypotheses concerning the nature of the process by which this result has been attained.

It must be admitted that the conceptions of psychology are abstractions removed by their simplicity from the complexity of actual experience. Like every other science psychology must simplify its problems. It cannot, any more than mechanics, physics or physiology take as its data the full complexities of the concrete. Yet it must always guard against the danger of attaching too much independent reality to its abstractions. There is a sense in which the analysis of a complex experience is a destruction of its unique character, since an experience is something other than a sum of its parts. We can analyse a tune into a temporal succession of notes of definite pitch with certain time intervals between them. When, however, we have made a list of the notes and the pauses between them, we have described merely the sensory elements of which the tune is made up. We have not described the tune.

The theory that mental growth consists in the combination and re-combination of elementary units, rests at bottom on an error of observation. But it is an error which led to the important system of psychological doctrine known as "Associationism." Distinct processes were taken for separate ones; and the mind became a "manifold" of elements called sensations and their weaker "copies" or mental "images." Some thinkers regarded mental development as analogous to a process of chemical combination, the ultimate units being analogous to chemical "atoms"; and the "atomistic" conception of the structure of mind still finds a certain amount of influential support.

A return to psychological reality was made when William James and later psychologists described the process of thought as a flux in which the sensation or image was only a relatively stable element. While abstraction is a legitimate method for psychology, it must not lose sight of the complexities of actual experience, and its duty to attain description more and more adequate to that complexity.

CHAPTER III.

ULTIMATE DIVISION OF SUBJECTIVE PROCESSES.

The aim of the present chapter is to distinguish the most general and ultimate kinds of subjective process. Our question is : What are the ultimately distinct modes of being conscious of an object ? The most usual answer is that there are three such modes, Cognition, Feeling-attitude, and Conation.

Under Cognition is included the bare fact of the presentation of an object to consciousness together with the subjective attitudes of questioning, believing, disbelieving, doubting, and so on.

Under Feeling-attitude is included the being agreeably or disagreeably affected towards an object, or feeling some kind of emotion towards it, such as anger, surprise, or fear.

Under Conation are included all felt appetency or endeavour, all longing, wishing, craving, desiring, willing.

This threefold division has been current since the time of Kant. Previously, Feeling-attitude had not been made a separate head, so that only two ultimate processes were recognised—the Cognitive and the Conative, knowing and willing. Of late there has again arisen a tendency to fall back upon a dual division, bringing Feeling-attitude and Conation under the same head. It is clear that they are much more closely akin to each other than either of them is to Cognition. It also seems clear that there is as fundamental a distinction between the bare thought of an object and the affirmation or denial of its reality as there is between Feeling-attitude and Conation.

The best plan is to adopt a most comprehensive dual division into "Cognition" on the one hand and "Interest" on the other. Cognition may then be subdivided under the heads, Simple Apprehension and Judgment; and Interest may be subdivided under the heads Conation and Feeling-attitude.



Simple Apprehension and Judgment.—First let us examine the distinction of Simple Apprehension and Judgment.¹ It is one thing to apprehend the meaning of a proposition and another to believe, disbelieve, doubt, or question it. To think of a thing is not the same as affirming or denying its existence.

This distinction is not merely formal. Simple apprehension is not merely distinguishable from Judgment. It is also separable from it in a partial and relative way. It is important to note the saving clause—"in a partial and relative way." I do not mean to say that the total subjective attitude at any moment can be one of simple apprehension without any admixture of judgment. On the other hand, it is clear that there can be no judgment without simple apprehension. That would be judging without anything to judge about.

I now proceed to give instances of the relative and partial separation of simple apprehension from judgment.

It is possible to be interested in an object without reference to its real existence. Thus the bare thought of being hissed may affect an actor disagreeably, and the mere idea of a comic situation may excite laughter. Suppose that a man is absorbed in the enjoyment of the beauty of a picture. He is aware of the picture as really existing and so far his mental attitude is one of judgment or belief. But this unformulated judgment is in the background of consciousness. It has nothing to do with the man's enjoyment. His interest is not in the real existence of the picture but in the mere presentation of it. If

¹ This distinction is to be found in all ordinary text-books of logic, but not from a psychological point of view.

it threatens to fall and he stretches out his hand to save it, there is a transition from interest in what is simply apprehended to interest in real existence. A similar change of attitude takes place if he passes from purely aesthetic contemplation to the business of purchasing the picture.

In the play of fancy, *e.g.* in day-dreaming, we do not attempt to conform our thoughts to reality. Throwing aside such restrictions, we shape the object of consciousness as we like. So far as this freedom extends (and it is never complete), the object is an object of simple apprehension and not of belief, disbelief, questioning, or doubt. We do not affirm, we do not deny, and we do not doubt its reality, so far as the merely imaginative attitude is maintained. We simply abstain from raising questions of this kind.

An illustration of a different sort may be drawn from the use of words in speaking, reading, writing, and silent thinking. The words as printed or written characters or as articulate sounds are somehow present to our consciousness. But we are not usually framing judgments about them. So far as we judge, we judge concerning that which the words signify. As articulate sounds or as written or printed characters, the words are in the main objects of simple apprehension merely.

Conation and Feeling-attitude.

Conation.—The peculiar nature of conative consciousness—of craving, longing, desiring, willing, etc.—is characterised by its relation to what is called its satisfaction or fulfilment. In so far as conation is satisfied or fulfilled, it disappears in its own satisfaction or fulfilment. Thus hunger disappears with eating and curiosity disappears when its questions are answered. Conation may cease in other ways either for a time or permanently. Thus it may be displaced or overborne by other interests, or it may die out through fatigue, or because it is persistently balked or disappointed. But the kind of ending which is distinctively prescribed for it by its own intrinsic nature is attained only when it terminates in its own fulfilment. It disappears in its own fulfilment as a question disappears in its answer. Just as the question is no longer a question when and so far as it is answered, so the desire to

know the answer ceases to be a desire when and so far as the answer becomes known.

Conation and its satisfaction can never completely coincide in the same moment of consciousness. Otherwise the conation would from the outset be merged and lost in fulfilment, and it would therefore not be felt at all. In order that it may be felt there must be at least a partial delay of complete satisfaction. This is possible in two ways.—

In the first place, the satisfaction may come gradually, so that we are progressively becoming satisfied, and yet in each stage of the process we are partially unsatisfied. For instance, we sit down to a meal with a ravenous appetite ; and in eating we gradually take off the edge of the appetite. None the less the appetite is still felt, though in a diminishing degree, until it is fully appeased—until it is satiated.

In the second place, we may not only be partially unsatisfied, but not even advancing towards full satisfaction. We may feel a keen appetite for food, when no food is accessible ; we may long after something which is entirely beyond reach, such as the undoing of a past action.

The conative side of our nature is the *active* side. Whatever takes place or fails to take place in consequence of the intrinsic tendency of conative consciousness to find its own fulfilment is said to be *pro tanto* due to our activity. Successful activity is the self-fulfilment of conscious endeavour or purpose.

It is important to distinguish between the *Satisfaction* of conation and its *Object*. The Object of conative consciousness is constituted by the conditions of satisfaction as they appear to the subject in advance of their actual occurrence. This previous view of the conditions of satisfaction may be fragmentary and indefinite in varying degrees. It may be, in varying degrees, true or illusory. Without some anticipative cognisance of what we want there would be no conation in the proper sense, but at the most mere restlessness. But the anticipation may be of the vaguest kind. What is essential is that there should be some clue, however slight, so that our striving consciousness may not be absolutely blind and undirected.

Take the case of wanting to know something. If we start

with a definite question, we anticipate a correspondingly definite answer. But of course we do not know beforehand precisely what the answer is going to be. Otherwise we should not be seriously asking the question. To this extent, what we want is indefinitely apprehended by us. But in some cases there is not even a formal question. There is a vague awareness of ignorance or of confusion hard to formulate in any distinct way. We are puzzled but cannot lay our finger on the difficulty. It often happens in such cases, that a wrong question is asked, so that the answer turns out to be more or less irrelevant.

Or again, to take a classical instance, a man of business is dissatisfied and longs for a life of retirement and leisure. Yet when he obtains what he thought himself to want, he discovers that it is not what he really desired. It is not actually satisfying. His previous view had been in part indefinite and in part illusory. To a very large extent we only find out what we want, if at all, in the process of attainment; and in the same way we are frequently discovering that we do not really want what we had supposed ourselves to want. The course of conative process towards satisfaction is marked by trial and failure, leading gradually to better-instructed and more successful trials.

The object of conation is always apprehended as change in what is regarded as an actual situation. The actual situation is apprehended as alterable. The change may be thought of either as the removal of some pre-existing feature of the situation or as the addition of some positive feature which is as yet non-existent. When the main emphasis is on the removal of what is actually present, conation is called aversion. Repugnance, hatred, dislike, regret, antipathy, etc., are forms of this negative direction of striving consciousness. When the main emphasis is on the introduction of what is actually absent, conation is called appetition. Special forms of this are longing, desire, aspiration, etc.

The total object of conative consciousness includes two parts: (1) what appears as the end, (2) what appears as the means. We wish, will, or desire the end for its own sake, and we wish, will, or desire the means because without them the

end is not attainable. However indifferent, or even repugnant, the means may be in themselves, yet in so far as they are means to the end they are part of the object of conation. This object remains relatively indefinite and fragmentary so long as the means are unspecified. We know completely what we want only when we know how to get it or see clearly that it is unattainable.

Feeling-attitude in all its variations is most intimately connected with conation. We may distinguish three groups of cases :—

Under the first come all those phases of feeling-attitude which occur as episodes in the life history of a pre-existing conation—all pains of disappointment or defeat and all pleasures of success or fruition, together with concomitant varieties of specific emotion, anger, fear, hope, despair, triumph, etc. These feelings occur in connection with the various ways and degrees in which conative tendencies are being satisfied or dissatisfied, furthered or hindered. In such instances it is evident both that conation and feeling-attitude are distinguishable, and also that they are blended in the most intimate unity.

In the second group of cases feeling-attitude and conation emerge coincidently, so that we cannot ascribe priority to either. In toothache the disagreeable consciousness and aversion coincide. Indeed, it seems super-subtle to make a distinction between them. Common sense does not do so. It finds no occasion to recognise the presence of conation at all until some kind of attempt is made to obtain relief. But, in strictness, the conative attitude of aversion is present from the outset, and the attempt to obtain relief is a development of it.

In the third group of cases, feeling-attitude exists by itself without any appreciable intermixture of conative consciousness. Suppose that we are lying by the side of a brook on a summer day and simply allowing ourselves to be soothed by sights, sounds, odours, and our healthy bodily sensations. Here there is certainly agreeable consciousness of ourselves and of our surroundings. But it may be difficult or impossible to trace any felt conation. Our condition appears to be

purely inactive. But in such experiences, the conative attitude is always lurking, as it were, behind the scenes, ready to emerge at once, if the pleasure-giving conditions are in any way interrupted or discontinued before satiety is reached, *e.g.* if the sun becomes unpleasantly hot, or the flies disturb us, or some one attempts to rouse us.

The reason why, in the case we are now considering, conation fails to appear while the pleasure-giving condition continues is that it is continuously merged in its own satisfaction. There is always a potential conation, and it is only in reference to this that the feeling-attitude can properly be called *Interest*. For the term "interest" always involves reference to a satisfaction which is not yet completely attained. In the present class of instances the reference is to a satisfaction in which even the potential conation terminates. In other words, the reference is to *satiety*—that phase of the process in which continuance of the pleasure-giving condition would cease to give pleasure and would only bore us.

At this point we might fitly proceed to discuss the connection of Cognition and Interest. But I reserve this for a subsequent chapter on Attention, which is the meeting-point of Interest and Cognition. Before dealing with this topic it will be found convenient to say something about the relation of Body and Mind, and also about Sensation. These will form the subjects of the next two chapters.

CHAPTER IV.

BODY AND MIND.

General Nature of their Connection.—A multitude of the most familiar facts of ordinary experience point unmistakably to a most intimate and thoroughgoing interdependence of bodily process and psychical process. When a flame comes in contact with my skin, I feel a certain painful sensation. When I will to move my finger, my finger moves. Mental anxiety may produce headache, and headache may make us unequal to mental exertion.

Science extends the range of evidence beyond what is accessible to common-sense. Besides this, it has succeeded in distinguishing those bodily processes which are directly connected with the conscious life of a human being from those which are connected with it only indirectly. The psychic processes are directly connected with occurrences in the nervous system, and indirectly with occurrences in other tissues and organs.

The function of the central nervous system is to control and combine the various processes which go on in different parts of the organism. From all parts of the organism impulses or waves of excitement are propagated to the spinal cord and brain along ingoing or afferent nerve-fibres, and in return impulses are sent from them along outgoing or efferent nerve-fibres to the muscles distributed in various parts of the organism. The central nervous system thus makes possible the cooperation of different organs, integrating or binding them together into a dynamic unity. Hence the immediate connection of psychical processes with the process in the nervous system involves a mediate connection with all other parts of the body.

But the psychical processes of human beings are not directly connected with all parts of the nervous system, but only with that part of it which is situated within the skull. And even here the immediate connection seems to be mainly, though not exclusively, limited to the topmost layer of grey nervous tissue which is called the cortex of the cerebrum. Our psychical processes have as their immediate material correlate cortical or cerebral processes. The precise nature of the correlation is not known. But for psychological purposes, the hypothesis of psychological or psycho-neural parallelism supplies the most convenient way of formulating the facts, so far as we are acquainted with them.

Following this hypothesis we treat the connection as simply one of concomitance, and concomitant variation. When a certain psychical process occurs, a certain cerebral process occurs simultaneously with it. Variations in the nature of the psychical process are attended by strictly correspondent variations in the nature, and to some extent in the locality, of the correlated cerebral process.

Thus when the contact of my finger tips with an external object occasions a touch sensation, what happens is as follows:—The contact sets up a wave of excitement originated in certain minute end-organs in the skin which is transmitted along certain afferent or ingoing nerve-fibres and along part of the ascending nerve tracts in the spinal cord until it reaches the cerebral cortex. There it produces a molecular disturbance, and coincidently with this, the psychical state, which I call the experience of touching something, comes into being. The external stimulus cannot give rise to the touch sensation without at the same time and in the same act giving rise to the corresponding cortical process.

Similarly, when I will to move my finger, and the finger in consequence moves, the psychic state, which I call my volition, is coincident with a certain agitation of the particles of the nervous tissue of my brain. This cerebral disturbance sets going currents of excitement which are finally propagated along outgoing nerves to the muscles which move my finger. These contract and the finger moves. The volition without the correlated cortical process would not move the finger.

On the other hand, we cannot say with the same confidence that the correlated cortical process can never exist without the volition. Normally the cortical excitation which results in the movement of the finger is accompanied by the experience of volition, but there are conditions of dissociation of personality in which automatisms are found, *i.e.* movements which are apparently originated cortically but of which the main personality has no experience (although it is possible that they may be parts of the stream of experience of a secondary personality).

The hypothesis of psycho-physical parallelism is, as we have said, simply a convenient way of formulating the facts so far as they are known to us. It lays no claim to established certainty, and it must not be taken to imply or suggest any metaphysical theory. Above all, it must not be supposed to imply that psychical processes are in any way products—not even bye-products—of the correlated nervous processes. Such a view in my opinion leads to intolerable absurdity. But this is not the place to discuss the metaphysical problem. What interests us psychologically is that the facts represented by the formula of psychophysical parallelism give us access to a great deal of useful knowledge concerning the conditions of psychical processes, and to some extent help us to understand their nature.

“Higher” and “Lower” Nervous Arrangements.—We now proceed to consider certain important aspects of the general correspondence of mental and nervous occurrences. (1) The correspondence of the distinction of higher and lower psychical processes with that of higher and lower nervous arrangements. (2) The correlation of psychical dispositions with physiological dispositions.

Lower nervous arrangements are related to higher as the nervous system in general is related to the rest of the body. The nervous system is a unifying centre which connects in varying combinations the processes going on in other tissues and organs. Similarly, a relatively higher nervous arrangement combines and coordinates the workings of relatively lower nervous arrangements. Apart from the higher the

actions of the lower are comparatively detached and isolated from each other. In relation to the rest of the nervous system, the cerebrum is a higher nervous arrangement.

It is well known that a frog, from which the cerebral hemispheres have been removed, can, by the application of appropriate stimuli, be induced to perform nearly all the movements which an entire frog is capable of executing. "When thrown into the water it begins to swim, and goes on swimming until it is exhausted. If placed on its back, it recovers its natural position. If its flanks be gently stroked, it will croak; and the croaks follow so regularly and surely upon the strokes that the animal can almost be played upon like a musical instrument."¹ The decapitated frog is capable of all the elementary movements necessary for the preservation of its existence. But they occur in detachment from each other. They are combined and coadjusted in varying ways in response to varying circumstances.

The whole nervous system, including the brain, appears to be throughout organised on a similar plan. Relatively lower nervous arrangements are coordinated and controlled in their operation by relatively higher, and these again by higher, and so on. When a man begins to learn to swim or to play the violin, the separate movements required are already roughly provided for by his pre-existing nervous organisation. What he has to acquire is the due combination and coadjustment of these elementary movements in simultaneous and successive order. This acquisition involves the formation of a higher nervous arrangement which coordinates the action of the lower nervous mechanisms, using them as its instruments. Similarly, the pronunciation of words is connected with a special nervous arrangement for variously combining and coadjusting the movements of the tongue and larynx.

In general, the lower nervous arrangements are more *stably* organised than the higher. They are more fixed and uniform in their mode of action, less capable of varying responses to fluctuating conditions. "In the brainless frog, each stimulus evokes an appropriate movement," and always the same

¹ *Text-book of Physiology.* By Michael Foster. *Sixth Edition,* pp. 1000-1001.

movement, whereas with the entire animal it is impossible to predict whether any result at all, and, if so, what result, will follow the application of the stimulus.¹

This distinction of higher and lower in nervous organisation is correlated with a corresponding distinction of higher and lower in psychical processes. Playing on the violin is a higher mental process than the isolated performance of the elementary movements which are combined in it. The discovery of a theory binding together a multiplicity of detached facts in the unity of a single principle is a higher mental process than the apprehension of the several facts in comparative isolation. The systematic combination of successive acts in subordination to a single end or principle of conduct is a higher psychical process than the performance of similar acts on the detached impulse of the moment. As the psychical process is higher, so the nervous process correlative with it is correspondingly higher in the sense explained.

This is well illustrated by the gradual action of drugs and similar agents on the nervous system. The highest nervous arrangements, being least stably organised, are first affected, and then progressively the lower in descending order. The effect of alcohol may serve as an example:—

The first well-marked symptom is a diminution of self-consciousness. It is notorious that a man when slightly under the influence will boldly do and say things that in his normal state he would refrain from doing and saying, owing to the rapid representation of himself as he would appear to the eyes of others. At this stage he may begin to talk more fluently and perhaps more brilliantly than in his sober state. But the power of sustained and continuous thinking becomes more and more impaired as the alcohol takes more hold on his nervous system. There is a comparative absence of coherence in his talk, though it may continue to show isolated brilliancies.

At a later stage, the incoherence and the limitation of range become more marked. The man "may repeatedly perform some such action as shaking hands or the asking of some question, without remembering that he has gone through the

¹ *Text-book of Physiology.* By Michael Foster. *Sixth Edition,* pp. 1000-1001.

same performance in the previous moment." The finer movements—requiring accurate coordination and attention—are no longer possible.

In a yet later stage such actions as walking cannot be performed, owing to the inability to balance the trunk and coordinate movements, but the purely reflex element in walking, the rhythmic movement of the legs, is still possible, for if supported on either side, the patient may still walk very well. Finally, coma intervenes—the drunken sleep.¹

Before leaving this topic, there is one point which I wish to emphasise. It is that the physiological evidence is against what is called associationism. According to the associationist, higher mental processes are merely resultants formed by the combination or fusion of lower. For instance, the perception of an object is regarded as merely a complex of sensations. It is regarded as being merely these sensations combined in a group or cluster. But we have seen that the coordination of lower nervous processes depends on a relatively new and distinct nervous arrangement. According to the principle of psychophysical parallelism, this must mean that the synthesis of lower mental process in a higher unity depends on a relatively new and distinct mental process. The higher mental process does combine the lower, but it is not merely the lower in combination. It is rather their coordinating centre of unity.

Evidence of Correlation from Physical Injury and Disease of the Brain.—Injury or disease of the brain may cause disturbance of mental functions. A diseased condition spread over the whole cortical surface is found to produce widespread mental disturbance. A small injury, on the other hand, may cause only the loss of certain functions or of certain specific kinds of sensory experience. Greatly increased knowledge of the results of injuries to specific parts of the cerebral cortex has resulted from the careful examination of the results of head wounds during the war.

Examination of the surface of the cerebrum shows it to consist of a crumpled grey layer—the cerebral cortex. This,

¹ This description is adapted from an article by W. MacDougall in *Mind*, N. S., No. 27, p. 380.

as we have seen, appears to be the main organ of consciousness. The part of the cerebrum under the cortex is white and composed of multitudinous nerve fibres some of which connect the cortex with the outlying parts of the body, while others connect different parts of the cerebral cortex with other parts of the cortex itself. The highly coordinated activities of conscious behaviour, and the complex interrelations of psychical operations involved even in an apparently simple act of thinking are made possible by this system of connecting neurones in the white matter of the cerebrum which enable the cerebral cortex to act as an integrated whole. The unity of consciousness has its physiological concomitant in the inter-connections of the cerebral cortex.

As an example of the general disturbance of mental life resulting from a diffused injury to the cerebral cortex we may discuss (a) the general amnesia or loss of memory which is usually found in old age and in certain diseases of the brain. Examples of specific losses of function caused by local injuries to the brain surface are to be found in (b) paralyses or losses of the power of movement, (c) anaesthetics or losses of sensation, and (d) disturbances of such complex functions as the use of words in speech.

(a) In old age the mind loses its power of remembering experiences of the past. The power of remembering recent events is generally even more strikingly lost. Thus both the functions of revival and of recording are disturbed, but the latter disturbance is the more complete one. An old man remembers the incidents of his early life more clearly than he can remember those of yesterday. Since the power of remembering the immediate past is necessary for a correct orientation in time and place, this orientation may be more or less completely lost in senility. A condition of confusion then results in which the patient does not know where he is or what are the day of the month and time of the day. He is also unable to carry on a conversation because he cannot remember what has just been said to him, and he may, before the end of a sentence, forget what he began to say.

This loss of the power of remembering is found to be correlated with degenerative chan

surface of the cerebral cortex. The same symptoms are to be found when similar injury to the cortical surface is the result of disease. In all of these cases, as might be expected, loss of memory is not found to be the sole result of this condition. The areas of the brain surface concerned in movement and sensation are also affected with resulting disturbances of movement and perception.

Such cases as the above must be sharply distinguished from those partial or complete losses of memory which have a psychological and not a physiological basis. There are conditions of alteration of personality in which there seems to be complete loss of memory up to a certain incident.

An example is to be found in the double personality of Mary Reynolds described by William James in his *Principles of Psychology*. At the age of eighteen, after a very long sleep, she woke up with no memory of her previous life at home, so that her parents seemed to her to be strangers and she had to re-learn reading and writing. In such cases as this, no perceptible injury to the brain is found, and the loss of memory seems to be due to a breaking up of the unity of personality, or to a "dissociation of personality." This means that groups of mental dispositions have come to function separately, and their functioning contributes to separate streams of experience. The persons occasionally reported in the newspapers to have been found suffering from a "loss of memory" are generally those suffering from a mental dissociation of the same order.

Of this kind too, are the examples of the loss of particular tracts of memory—of the memories connected with a particular event or of all memories of a particular kind. It should be clear that the condition of a person suffering from loss of all the memories immediately preceding and following a particularly shocking incident cannot be attributed to a localised injury to the brain, for a particular range of memories is not stored in one special part of the brain. In all acts of remembering it seems certain that many parts of the brain are involved. There is no storehouse of images in the brain in which memories lie side by side so that some may be destroyed by a local injury while others remain.

(b) There are, however, definite parts of the brain surface whose function is to initiate movement in particular muscle groups, and whose destruction causes a paralysis of those muscles. This "motor area" is found to lie in front of the great fissure of Rolando which runs down the middle of the cerebral surface. The immediate effect of the destruction of even a small area of the cortex is, it is true, a very general one. For example, a sudden injury to a small part of the motor area causes a widespread loss of function, including a general paralysis. This, however, passes off, and all that remains is a paralysis of a limited group of muscles which differs with differing positions of the cerebral injury. The upper part of the "motor area" of the brain is found to be connected with movement of the lower muscles on the opposite side of the body, while movements of the muscles in the head result from the activity of the lower part of the area of the cortex on the same side. This was established by Sherrington's observations on the movements which took place in the limbs of anaesthetised apes when different parts of the cortex were stimulated electrically, and also by observation of the kinds of paralysis which resulted from local injuries to the cerebral cortex in wounds of the head and diseases of the brain.

It should be particularly noted that what is lost as a result of destruction of a part of the motor area of the brain is the power of initiating movements in the corresponding group of muscles. The muscles may still be capable of movement. The withdrawal of a limb from a prick may, for example, be a reflex in which the brain plays no part. Such a reflex withdrawal is found to take place after the destruction of the corresponding motor area of the brain has made voluntary movement of that limb impossible. The effect of the brain injury is, in fact, to make impossible the inhibition of such a reflex withdrawal.

(c) The discovery of the different parts of the brain surface concerned with the various sensations proved a less easy matter. No very definite results could follow from experiments on animals. One American surgeon, who was compelled to perform an operation on the brain of a patient without an

anaesthetic, obtained the permission of his patient to stimulate electrically parts of his cerebral cortex and found that the patient could report sensations from various parts of the body. Such experiments are likely, however, to remain rare.

The satisfactory solution of the problem came only with the clinical examination of the larger number of definitely localised brain injuries which took place during the war. Many of these were found to be accompanied by a limited loss of sensation, and the sensory areas have been mapped out by a comparison of these cases. The visual area, for example, was found to be situated towards the back of the brain, and it appeared that every part of the surface of the retina was represented on a different part of this visual area of the cerebral cortex. A similar definite location has been claimed for hearing and for other senses.

The integrity of these sensory areas of the brain seems to be the necessary condition for sensations from the corresponding sense organs to enter into consciousness. If they are destroyed, reflex action as a result of stimulation of a sense organ is still possible. If the visual areas, for example, are completely destroyed, it may be found that the iris of the eye contracts when bright light falls on the eye, but the subject does not have the experience of seeing the light. It also appears that the integrity of these areas is necessary for the experience of the corresponding mental imagery. A man who is blind as a result of injury to the retina can still have visual images, but if he is blind as a result of injury to the visual areas of his brain, these also are stated to be lost.

While the main facts of the specialisation of certain parts of the brain for certain sensations and movements is unquestioned, we must be on our guard against the attractions of a more simple theory of cerebral localisation than is warranted by the facts. Sherrington has discovered facts which show that the relationship between stimulation of any one part of the cortex and the movement evoked is a less simple one than appears at first sight. The actual muscle moved was found to depend not only on the point in the cortex stimulated, but also on what parts had been previously stimulated. He also points out that, after a group of muscles

has been paralysed by removal of the appropriate part of the cerebral cortex, after a sufficient lapse of time the movement of these muscles may return, although the missing part of the cortex is not regenerated, and the movements in question cannot be elicited by stimulation of neighbouring parts of the cortex. Although, from the nature of the case, the evidence is less definite in the case of localisation of sensation, there is no reason for supposing that the association between a particular point in the cortex and the sensation evoked by its stimulation is an absolutely fixed and definite one.

(d) The relationship between special parts of the brain and the more complex mental functions is undoubtedly a much less simple one. Modern speculation on this subject was begun by Gall who located such complex functions as the various intellectual and moral capacities in various parts of the brain. Gall was a great anatomist, but this part of his work rested on an extremely slender foundation of observation, and is now completely discredited, surviving only in the pseudo-science of phrenology. The most serious theoretical objection to his hypothesis is that there is no reason to suppose that the faculties he located are mental units at all. "Memory," for example, is a practically convenient term for all mental processes which put us in touch with our past experiences, but such processes are of many different kinds and all involve a variety of mental operations.

If we do find unitary complex processes located in separate parts of the brain, it is unlikely that these will be the units crudely distinguished for practical purposes in ordinary speech. We cannot hope to find the faculty of memory located in one part of the brain, for every memory involves many parts of the brain, and different acts of remembering probably involve different parts.

The next stage in this problem was Broca's localisation of a centre for speech. It was known that injuries to one side of the brain might make speech impossible, while the patient was still able to move his tongue, lips, etc., in other activities such as mastication. This was the condition at first called *aphemia* and afterwards *aphasia*. Broca said that there was one convolution (the third frontal on the left side) whose

destruction caused the loss of speech. This was, therefore, claimed to be the cerebral centre for speech. The anatomical evidence was not conclusive and sometimes seemed to contradict Broca's theory, but while there was some controversy as to its exact site, the existence of a centre for speech was generally accepted.

Conditions of *alexia* and *agraphia* were also described in which there are respectively loss of the power of reading without other disturbance of vision and of writing without other motor disturbance. Similarly a state of *word-deafness* was described, in which spoken words were not understood although hearing was not otherwise impaired.

These conditions were explained by the construction of diagrams in which the various elementary parts of the activity of using and understanding language were localised in different parts of the left lobe of the cerebral cortex. One such diagram, for example, showed four centres : for word-vision, for word-hearing, for lip-movement, and for hand-movement. All of these affections of language were supposed to be due to the destruction of one of these centres or of the connecting fibres between them. Thus word-blindness would be due to destruction of the word-vision centre, *agraphia* to the cutting of the fibres connecting the hand-moving centres with those for the perception of words, and so on.

Dr. Head has shown, however, by his study of aphasias produced by war wounds, that the matter is much less simple than this. He maintains that there is no pure word-blindness, word-deafness, etc. He finds that when sufficiently careful tests are made all the language functions are found to be disturbed in aphasia though sometimes to different extents. He concludes that there is no evidence that such functions, as word-vision, word-hearing, etc., are localised in definite parts of the brain or even that they are really mental units at all.

He finds that what is damaged in an injury occurring anywhere in a large part of the left cerebrum is the power to formulate one's thoughts as words either externally or as internal speech (as was long ago maintained by Hughlings Jackson). Thinking in words is affected as well as speech,

and also activities depending on verbal thinking (such as playing cards, or calculating change after a purchase) are liable to be more or less affected. This disturbance of the fitting of words to non-verbal thoughts may take different forms in which the main disturbance is difficulty in finding any words at all, difficulty in making the grammatical connections between words, difficulty in finding names for objects although other words may be retained, and, lastly, difficulty in using words to convey meanings. He finds that these four forms of aphasia are associated in a very rough way with different positions of the brain injury, but not sufficiently definitely for it to be possible to say that they result from destruction of separate faculties localised in special parts of the brain.

It is clear that we are only at the beginning of our knowledge of how the brain works in its more complex activities. Gall was certainly right in repudiating the view that the brain worked as a whole and in believing that different parts of it performed different functions. He proved to be wrong in the localisations he did assign. The study of cerebral geography warns us that it is dangerous to assume that the mental activities for which we use a single word in ordinary speech are the real units of cerebral activity. It is only by further researches along the lines of Head's work that we can even know the terms in which we must formulate the problems of the cerebral localisation of complex functions.¹

¹ On the subject of the localisation of cerebral functions the student may consult Head's *Aphasia*, Vol. I., Cambridge, 1926, or Piéron's *Thought and the Brain*, London, 1927.

CHAPTER V.

SENSATION.

We saw in Chapter I. that sensations are psychical states inasmuch as they have actual existence only while they are actually experienced. We also pointed out that they are not subjective states, like attending and willing, but essentially objects. They are psychical objects. In order to complete our account of their distinctive nature we now add that they are psychical objects which normally come into being in consequence of the stimulation of afferent nerves conducting waves of excitement to the cerebral cortex. The excitement is initiated at the termination of the afferent nerves in external organs of sense, such as the skin, eye, or ear, or in the surfaces of the internal organs of the body, such as the stomach.

Sensory Revivals.—The various qualities of sense-experience, when they have once been presented, may be mentally revivable without a recurrence of the stimulus which first gave rise to them. Having seen the colour red, I can picture it in my mind's eye without actually seeing it. Having actually heard a certain sound, I can hear it again in my mind's ear without any stimulation of my bodily ear. Such revivals differ in important respects from actual sensations, and they ought not therefore to be called sensations. They may be called sensory contents or sensory elements.

Plan of Treatment.—In dealing with sensations my plan of treatment will be as follows :—First, I shall say something of the distinction between sensations as psychical states and the sensible qualities of external things. Next I shall refer to

the physical and physiological conditions. I shall then give a general analysis of the nature of sensation. I shall draw attention to certain characters which sensations in general possess. Finally, I shall discuss the qualitative affinities of different kinds of sensation and examine the distinction between the higher senses and the lower.

Sensations vs. Sensible Qualities.—The distinction between sensations and sensible qualities of external things is of fundamental importance. Consider again an illustration given in the first chapter. On looking at an orange I experience a sensation of yellow. The sensation did not exist before I began to look at the orange and it ceases when I look away. But the physical properties of the orange which were the condition of my having a yellow sensation were the same before I looked at it, and remain the same after I look away.

Since this physical property of reflecting only light waves of certain lengths is also a condition for producing a yellow sensation when the light reflected falls on the retina of any normal eye, we may call this property the yellowness of the orange. The same word "yellow" is thus used for a qualification of my psychical state, and also as expressing the nature of something existing independently of me and of the vicissitudes of my sensuous experience. This something thus represented in terms of my sense-experience, but existing independently of it, is what I call an orange.

We shall have something to say later on about the origin and development of this distinction between sensation and sensible quality. Here it will be sufficient to draw attention to one point. It is never our sense-experience in its concrete fullness which qualifies the external thing. Only certain partial features or aspects of it enter into the constitution of the external world. While I look at the orange my visual sensation of yellow may vary in intensity and tinge of yellowness with the varying illumination or with the state of my eye. If I were attending to my sensation as such, I should note these changes and regard them as psychically real. But when I am occupied with the orange, I in part ignore them altogether and in part treat them as irrelevant—as making no difference

to the orange itself. The artist in depicting the orange would have to note very carefully these differences of sensible appearance.

Again, the visual appearance of the object varies very greatly in extent according to my distance from it. As I recede from the orange the yellow patch, considered merely as a sense-presentation, grows smaller and smaller until it vanishes altogether. But within wide limits of variation we normally fail to notice these differences in the extent of the sensation. We are interested in the real size of things perceived, and this remains the same while the sensation varies. Hence we have learned to ignore these variations. Patients blind from birth who have recovered their sight by an operation do notice such differences. They find it hard to understand how a house seen at a distance can be spacious enough to contain a man seen at their side. The artist has to educate himself to observe visual sensations as distinguished from external things. For he can only produce his effects by giving those who look at his pictures sensations similar to those which they would experience in looking at the real things.

It would carry us too far to adduce more illustrations. The two points to be borne in mind are : (1) That sensible qualities are qualities of sensation regarded as expressing the nature of something existing independently of the mind which experiences the sensation. (2) That only certain partial aspects and features of our sense-experience assume this function. The rest can be ignored when our interest is concentrated on the external world. But it is the business of the psychologist who is dealing with sensations as psychical states to fix attention on them.

Stimulus and Sensation.—A full treatment of the physical and physiological conditions of sensation would include a detailed account of the special sense organs. For this we have no space. It will be sufficient to refer to one point of general interest bearing on the connection of stimulus and sensation. The general nature of the sensation excited depends not on the nature of the stimulus but on the structure of the sense organ and its nervous connections. However the organ of

vision is stimulated, if any sensation results, it is one of light or colour. Light and colour sensations arise from pressure on the eye or a narcotic in the blood, as well as from vibrations of the ether. In a case of assault, a court of justice was inclined to take seriously the plaintiff's statement that he had seen his assailant in the illumination produced by a blow on the eye. Even in the absence of all external stimulation, we have a diffused sensation of grey due to purely organic conditions which probably affect the brain directly and not the eye.

The case is the same for the ear as for the eye. Sensations of sound equally result, whether the organ of hearing is excited by mechanical or electrical stimulation or by vibrations of the particles of the air. In the skin temperature sensations arise only when certain nerve-endings are stimulated, distinct from those which yield pressure-sensations. When a peppermint rolled on the tongue gives rise to sensations of sweetness, temperature, and pressure, it does so by acting on nerve-endings which are distinct for each kind of experience. It is disputed how far the general principle applies to specific varieties of sensation within the range of each sense. But in the case of the ear, at least, there is good reason for holding that there are distinct nerve-endings for tones of different pitch.

Characters which Sensations in General Possess.—The characters which sensations in general possess are: (1) *Quality*, (2) *Intensity*, (3) *Protensity*.

Such distinctions as that between blue and red, between sound and colour, between a tone of one pitch and a tone of another pitch, between a salt taste and a bitter, or between taste and smell, are distinctions of *quality*. Definition is of course impossible. When two groups of sensations so differ in quality that they cannot be regarded as species of a common genus, the difference may be called one of *kind*. Sounds and colours are different kinds of sensation. They are not only different, but disparate or incomparable in quality.

Intensity presupposes quality. It is more or less of the same quality. Thus a tone of a given pitch may vary in

loudness. The sensation of cold is always more or less cold. A sweet taste is more or less sweet. Intensity is a quite peculiar kind of quantity. Its special characteristic is that it cannot be divided into distinct parts, and that we cannot even conceive it to be so divided. We may say that one sensation of cold is more intense than another. But we cannot distinguish within the more intense cold a part which is equal to the less intense cold and another by which it exceeds the less.

The *protensity* of sensations is connected with their duration. A sensation of sound which has lasted three seconds is felt as different from a sensation of sound which has lasted only one second. Protensity is a better term than duration. For duration would naturally stand for the actual time which a sensation lasts as measured by the clock. Protensity stands for the difference in our immediate experience of the sensation which is connected with its greater or less duration.

Extensivity is another general character of at least certain important kinds of sensation. But it will be more convenient to notice this feature when we come to treat of the perception of extension.

Different Classes of Sensation.—Passing now to the enumeration and comparison of the different classes of sensation, we may begin with the following provisional list: Sensations of sight, of hearing, of contact and pressure; those due to the varying states of muscles, joints, and tendons as dependent on the position and movement of the limbs; sensations of smell, of taste, of temperature, and finally organic sensations.

The last head requires some explanation. Under the term “organic sensation” are included sensations due to the state of the internal organs of the body, such as headache, thirst, muscular cramp, or fatigue, nausea, etc. Our general feeling of being well or ill is due to the whole mass of sensations arising from the general condition of the organism. Under organic sensations are also included such sensations as arise from a bruise, a blow, or a cut. These experiences are indeed initiated by agencies external to the organism. But they

may equally well be produced by very different external agencies, and they persist often for a long time, and may even increase in intensity after the external agency has ceased to operate. A wound persists after the knife has been withdrawn, and along with the wound the pain of it.

Qualitative Affinities of Sensation.—The classes of sensation which we have distinguished are marked off from each other by differences in the conditions of their origin and in the part which they play in our mental life. Besides this, some of them, such as those of sight, of hearing, of smell, and of touch, are so disparate in quality that we need not hesitate to rank them as radically distinct in kind. But between others more or less qualitative affinity is discernible. Experiences of heat and cold are ingredients of organic sensation. *E.g.* the cold thrill which runs down the back in certain emotional states, or the general glow produced by drinking a glass of brandy.

There is also an unmistakable affinity between organic sensations in general and those of pressure. Indeed, the theory has been propounded that all organic sensations are resolvable into pressure and temperature experiences. This view may be accepted if we bear in mind that our organic experiences include very peculiar varieties of pressure-sensation. Hunger, thirst, fatigue, nausea, and toothache are not disparate from cutaneous sensations of contact, as they are from sensations of sound or colour. But we cannot place them on the same level with such modifications of cutaneous pressure as roughness or smoothness.

Muscle, joint, and tendon sensations are clearly akin to those of pressure. The two groups of sensations are united in ordinary experience as if they belonged to the same sense. They are only distinguishable by an effort of analysis. Indeed, until comparatively recent times, they were not formally distinguished, at all. Further, when they are distinguished it seems impossible to discover any difference of kind between them, such as marks off either from smells or sounds, or sounds from colours.

There is also qualitative affinity and intimate union between

smells and tastes. What in ordinary language are called tastes are to a very large extent odours. An onion is mistaken for an apple when it is neither seen nor smelled, but only tasted. The only sensations of taste, strictly understood, are the sweet, bitter, salt, sour, and alkaline.

Higher and Lower Senses.—The various classes of sensation may be arranged in a scale proceeding from the higher to the lower. Organic sensation is at the bottom of the scale, hearing and sight at the top. Between these are interposed in ascending order, sensations of temperature, of taste and smell, and tactual sensations, together with those due to the varying states of muscles, joints, and tendons.

The relatively higher senses are more delicately discriminative than the lower. On the other hand, if we except hearing, they count for less as direct sources of pleasant or unpleasant feeling. In this respect, organic sensation is of altogether predominant importance. Even the pleasures and pains of the higher senses are very largely due to concomitant affections of our general organic sensibility. The depressing effect of the wind whistling down a chimney, the painful experience of having one's teeth set on edge by the scratching of a slate pencil, the faintness or nausea produced by certain odours, the enlivening influence of bright colours, are all in the main to be accounted for in this way.

Another most important ground of the distinction between higher and lower lies in the kind of combination into which the various classes of sense-experience enter. There are two ways in which sensations may combine, so as to form a unity. They may combine like the various ingredients which comprise the complex odour of a druggist's shop, or like the bitterness, sweetness, and aroma of a cup of coffee. On the other hand, they may combine as colours do when they bound each other in space so as to constitute definite outlines, shapes, or patterns. The first of these modes of union is called *fusion* or blending. For the second the term *colligation* has been proposed ; I prefer to call it *grouping* or *arrangement*.

Fusion is characterised by the absence of any definite *order* among the constituents of the sensation complex. If the

constituents are *a*, *b*, *c*, the *a* is not otherwise related to *b* than it is to *c*, or than *b* is to *c*. It is true that the several components are in various ways similar or dissimilar in quality or intensity. But these relations do not depend on the fusion. There is only one relation due to the fusion—the relation of being fused. The sweetness, bitterness, and aroma of the coffee are blended in the experience of drinking it. But the blending of the sweetness and aroma is not a relation distinct in character from the blending of the sweetness and bitterness. The mode of union of any two sense-qualities of the blend is not a distinct presentation, having a positive character of its own.

On the other hand, the meeting of adjacent colours does constitute a distinct presentation,—that of boundary or contour, which may vary in manifold ways according to circumstance. The meeting of a patch of red with surrounding grey is a definite shape, which may be square, triangular, or circular. The relation of the red to the grey is not that of the grey to the red. The red is within the square, triangle, or circle; the grey is outside. Further, the mode of grouping is largely independent of the sense-qualities grouped. We might substitute grey for red and red for grey, and yet have a triangle of precisely the same shape.

Clearly, grouping is a kind of combination peculiarly characteristic of the higher senses. The eye, the ear, and the skin, together with muscle, joint, and tendon, constitute the organs of what may be called the *shape* senses; the others are, comparatively speaking, shapeless. Simultaneous grouping belongs, above all, to visual experience. In a much less degree it is found in experiences of cutaneous pressure. We feel the contours of objects pressing on the skin. But we do so vaguely, as we discern shape and outline in twilight vision when all is grey. Other sensations, such as the organic, and those of smell, taste, and hearing, exhibit very little simultaneous grouping. Smells occurring together are not grouped, but fused, and the same is, in the main, true of sounds.

But sounds exhibit a remarkable development of successive grouping. The transitions between one sound and another have a definite and positive character comparable to the

uities. There is a marked difference between a mind in this condition and one which has, by a command or by the perception of an important outside object, been roused to preparedness to react.

We can best describe this difference by use of the word "alertness" for this general level of conscious processes. The inattentive or fatigued mind is in a condition of lowered alertness, while the mind of the person occupied with a salient train of thought, with an action, or simply in a state of preparedness to think or to act may be said to be in a condition of high alertness.

The lowest degree of alertness is the condition of sleep in which, although the sense organs are still capable of receiving stimulations and the efferent nerves of initiating movements, the customary response of conscious behaviour to received stimulation has disappeared. It is found that changes in alertness are accompanied by measurable bodily changes. The electrical resistance of the body is, for example, much less in the condition of preparedness to react to a stimulus, and is greater when alertness is lowered, and apparently attains a maximum in sleep.¹

¹ "The Causes of the Continuous Change of Resistance observed in Psycho-galvanic experiments," R. H. Thouless, *The British Journal of Psychology*, Vol. XVI., 1925.

CHAPTER VI.

ATTENTION.

General Properties of the Field of Consciousness.—It is an obvious property of the field of consciousness that not all possible objects of perception attain equal prominence and clearness of apprehension in the mind at any one time. The noise of passing vehicles will occupy a very unimportant position in the consciousness of a student absorbed in his work, while it would occupy an important position in the consciousness of a man waiting for the arrival of a friend. The prominence in consciousness of different possible objects of perception is clearly determined in part by the nature of the activity in which we are engaged. It is also a familiar fact that an increase of the prominence of one part of our field of consciousness necessarily causes a reduction in the prominence of other parts of the field, and that there is an upper limit to the extent of the field which can be clearly apprehended at any one time.

These are the effects which we ordinarily attribute to the *attention*. We say that we “attend” to that system of perceptions or ideas which is prominent in the mind, or, if its prominence seems independent of our volition, we say that it “forces itself on our attention.” Sometimes the prominent and clearly apprehended parts of the field of consciousness are said to be in “the focus of attention” or in the “centre of consciousness,” while the rest of the field of consciousness is said to be on “the margin of consciousness” or simply “marginal.” Those parts of the field of possible perceptions which attain so little prominence that they do not appear to introspection to have entered into consciousness at all are often said to be “subconscious.”

The act of attending to an external object may be accompanied by movements of accommodation of the sensory organs which make the perception of the object more clear. This is obviously the case when attention is given to a visual object. We more or less automatically move the eyeballs to alter their direction and the degree of their convergence so that the image of the object attended to falls on the sensitive central part of both retinae, and we increase or decrease the contraction of the ciliary muscles so that the object is sharply focussed.

It would be a mistake, however, to identify the act of paying attention with such movements of sensory accommodation. We can make ourselves watch (*i.e.* attend visually to) an object without looking directly at it. Moreover, the phenomena of attention are found also in those kinds of sensory experience in which there is no mechanism of accommodation. It is possible to pay attention to one conversation in a room in which there is much talking, although the ear has no mechanism corresponding to the movable eyeball and adjustable lens of the eye. A more striking example of this is to be found in the ability of an army signaller to pick out any one of three or four messages being sent simultaneously by Morse buzzer along the same line.

The Characters of Attention.—The essential mark of a thought or object attended to has already been spoken of as its prominence in consciousness. This is not to be confused with its intensity. The intensity of a sensation may sometimes cause that sensation to become prominent, as when an extremely loud noise (such as that of a close thunderclap) forces itself to the centre of consciousness to the exclusion of all else.

A sensation may, however, have similar prominence although its intensity is small. A scream of pain or terror forces itself into a prominent position in consciousness against much louder sounds of lesser emotional significance (such as those of the traffic in a busy city). For the property of being prominent in consciousness we may use the word "saliency." Instead of saying that the noise of the thunderclap or of the scream

have forced themselves into our attention, we may say that they have become "salient." The thunderclap becomes salient because it is intense, but its saliency is a different property from its intensity.

The saliency of a perception is a condition for its clear apprehension. We voluntarily induce that activity of the mind which we call "paying attention" to an object when we wish to know more about that object. Saliency is also a condition of mental retention. Material to be memorised must be salient during the process of learning. Also it is a condition for the conscious modification of a bodily movement. Movements that go on automatically follow customary paths. If we wish to learn a new movement, the awareness of that movement must be salient in consciousness while it is at first being performed. After the movement has become habitual, the awareness of its performance may be allowed to lapse from saliency. The movement may, in fact, be carried out automatically, *i.e.* unaccompanied by any awareness of its performance. The above is also true of processes of directed thinking. If we wish to think effectively our train of thoughts must be salient, for it will otherwise sink to the level of thought habits.

Another character of the field of consciousness is the limitation of its range. The becoming salient of one set of perceptions or ideas necessarily involves a loss of saliency of other sets. This is what we mean when we say in popular language that we cannot attend to more than one thing at a time. In actual fact, we find that more than one physical object can be clearly apprehended at any one time. Any number of marbles up to seven can be apprehended at any one time. Although separate as physical objects, the group of marbles form one psychical whole. If the number of irregularly arranged marbles is increased above seven the power of grouping them as a single whole is found to be lost. If, however, a larger number of marbles is arranged in five or six smaller groups (let us say in threes or in fives), it may be found that the complete collection can be apprehended as a single mental whole.

The truth underlying the statement that we can only attend

to one thing at a time is not, therefore, that the perception of only one physical object can be salient at any time. On the contrary, a very large number of physical objects may make up the salient psychical whole. This may be put in another way by saying that the object of attention is not a single physical object but a group of physical objects. When a physical collection becomes sufficiently complex, however, it may no longer be possible for it to form a single psychical whole.

A third feature of mental processes is that the salient elements in consciousness at successive times are not disconnected from one another but tend to serve interests or conative tendencies which continue over a certain length of time. Thus the mental processes in thinking out a chain of argument or in playing a game of chess are not disconnected from one another but form parts of a unity which extends over a certain duration of time. If, while we are playing chess, we are called away to attend to some other matter this continuity is interrupted and is resumed at a later time when we return to our game. The connection of successive steps within such a single train of mental processes determined by a single interest may be called "conative continuity."¹

Criticism of the Conception of Attention.—We have described above three fundamental characters of mental processes : the variation of saliency of different elements of experience (determined primarily by interests, instinctive or voluntarily sustained), limitations of span, and the determination of successive elements in mental processes by conative continuities. In ordinary speech we attribute these characters to "the attention." We describe the varying saliency of different elements of experience by saying that a certain perception or idea has caught our attention or that we have concentrated our attention on it. We express the fact of the limitation of mental span by supposing that we cannot give attention to one thing without withdrawing it from another, and we express the determination of successive

¹Stout, *Manual of Psychology*, Fifth Edition, pp. 176-79.

elements in consciousness by conative continuities by saying that they form parts of one continuous attention process.

While the word "attention" is a useful one in the discussion of these phenomena it is necessary to be on our guard against misleading implications of the word. The attention is not a separate mental faculty, it is a name given to the above characters of all perceiving and thinking. When we say that we are "giving our attention" to a particular object, it is necessary to remind ourselves that we are giving nothing whatever to that object, we are in reality making the mental adjustment necessary for the perception of that object to attain prominence in our field of consciousness.

When we say that one thing is in the focus of attention while another thing is marginal, we have probably in the back of our minds a more or less vague image of attention as a kind of searchlight which can be thrown on various objects, brightly lighting those in the centre of its beam, while those further from the beam become progressively more obscure. Such an analogy will be harmless so long as we use it only for illustration and try to draw no conclusions from it. If, however, we treat it as an adequate picture of attentive processes from which we may make deductions, we may be sure that we shall be in danger of being seriously misled.

In the past it has been customary for psychologists to take over this conception of attention from popular speech and to regard their task in this part of psychology as the elucidation of the properties of "the attention."

At the present time a radical criticism of this conception is becoming common. While the facts which have been described above are admitted, it is questioned whether they are made any clearer by bringing in "the attention" as an explanatory principle. It is doubted whether, when we have described the saliency of an experience, we have explained anything by attributing this saliency to the activity of "the attention." Professor Spearman points out that analysis by statistical methods of mental spans in different fields of sense experience shows that there is nothing in common between these spans in a single individual more than is due to his "general ability."¹

¹ *The Abilities of Man*, C. Spearman, pp. 367 ff.

In other words, there is no empirical evidence for a faculty of attention whose extent determines the span for different acts of apprehension (e.g. for grasping the number of dots in a visual perception and the number of taps in an auditory one).

Upholders of this view maintain that the attention as a separate entity is a conception condemned by the sound scientific principle that we may not multiply entities unnecessarily. If we accept this view, we may still use the term as a loose popular expression and as a convenient heading for a chapter in which we discuss the facts of span, saliency, etc., but we shall not regard it as a term standing for any special psychological function or faculty. We shall, in fact, treat it as we do the word "memory," which is found to be practically convenient, although we no longer refer the facts of mental retention and recall to a faculty of memory.

Various forms of the Field of Consciousness.—There is an obvious distinction between the character of the field of consciousness in what are called "concentrated attention" and "distributed attention." These may be described respectively as forms of the mental field characterised by restricted saliency and by diffused saliency. In the first of these conditions, only a small part of the field is salient, while in the other, a larger number of objects, activities, or ideas are simultaneously or successively salient during a period of time. Such operations as learning, whether of a mental task or of a new movement, demand concentrated attention, and experiment as well as common experience shows that learning without adequate concentration is carried on very inefficiently.

It is equally a matter of common experience that distributed attention is necessary in such activities as depend for their execution on adaptation of behaviour to a large number of diverse physical objects. Such activities are, for example, driving a motor car or crossing a crowded street. The motor driver who concentrates his attention on one source of danger to the exclusion of all others rapidly comes to grief.

The question of how far there can be a real "distribution of attention" over more than one task has been investigated

by Dr. McQueen.¹ He gave his subjects two disparate activities to be carried out at the same time, such, for example, as threading discs on a needle with one hand while crossing out every third of a row of o's with the other. Most generally the two tasks seemed to alternate in saliency. Very often there was a kind of grouping of the two tasks in which they were performed in a rhythm which made them a single more complex task. Occasionally, but rarely, the subjects reported that both tasks were simultaneously attended to without such grouping—both appeared to be in a position of saliency although there was no mental unification of them. Even when the two activities alternated in the focus of consciousness it was very often reported that the activity not in the focus of consciousness was still in consciousness though possessing a lesser degree of saliency than the other.

The question of whether it is possible to distribute the attention over many things does not, therefore, appear to have a simple answer. What is clearly true is that one part of the mental field attains saliency at the expense of other parts. Two objectively unconnected parts of the field may be made simultaneously salient by being brought into relationship with one another. In any case, although of two important but unrelated parts of the mental field, one is commonly much more salient than the other, yet the other has also some degree of saliency, and it appears that in exceptional cases, both may be equally salient.

One of the earliest attempts to apply the methods of psychological testing to industrial problems was the attempt to select tram drivers by testing in the laboratory their power to distribute attention. Tests of this kind are still used, although their theoretical justification is very doubtful. The assumption that distributed attention is necessary for efficient driving is undoubtedly true. In order that these tests may be justified, however, it is also necessary to assume that this power to distribute attention is a general power which is characteristic of all the activities of any particular individual. We have seen that Professor Spearman has produced evidence

¹ *The Distribution of Attention*, E. N. McQueen, *British Journal of Psychology Monograph Supplement*, No. 5, Cambridge, 1927.

that this assumption is false. In this case, there is no reason for supposing that an individual's power of distributing his attention in an operation measured in the laboratory is any indication of his power to carry out any other operation (such as driving a tram or a motor car) which requires distributed attention.

We may also distinguish an attitude of mind which may be called "expectant attention" or simply the attitude of "expectancy." This is the condition of the field of consciousness when we are prepared for a perception or for a reaction of a more or less definitely specified kind. It is the state of mind which we produce in the subject of a psychological experiment when we tell him to lift his finger from a key when he sees a light.

"Such expectant attention is frequently a source of illusion. We see what we expect to see instead of what is really present. . . . Where what is attentively anticipated is movement, or something producible by movement on the part of the person attending, there is a tendency to make the movement." This has been suggested as a probable explanation of some of the phenomena of "table-turning."

Experiment shows that the direction of expectant attention determines the time which elapses between the occurrence of a stimulus and the development of the resulting sensation. For a flash of light and a sound to be perceived simultaneously, the actual production of the flash must precede that of the sound by about '06 sec. The length of this time is determined, however, by whether expectation is directed towards the light or the sound; being greater if directed towards the expected sound, less if directed towards the light.

There can be no doubt that the phenomena of varying saliency are connected primitively with the demands of action. The salient perception is the one demanding action. The mouse is the salient feature of the mental field of a hungry cat, the smell of a rabbit to the dog, and the appearance of a hawk flying overhead to other birds. Sometimes the salient features in our own field of consciousness are determined in a similar manner. An escaped tiger at any time, or the smell

of a dinner cooking when we are hungry becomes salient because it is a perception imperiously demanding action. Its position in the conscious field is determined by its connection with those innately organised behaviour tendencies which we call "instincts."

But human life differs from animal life in the extent to which our interests may depend on secondary systems in which responses by immediate overt action plays no part. The attention given by a physiologist to all the problems connected with metabolism may be as spontaneous and involuntary as that which another man gives to his dinner. Or attention may be given to a task not for its own sake but because of something else to which it leads, as when a schoolboy studies Latin grammar for the sake of winning a prize. Attention of this kind has been called "derivative attention" to distinguish it from the "immediate attention" given to those things which have a direct interest.

The distinction has also been made between "volitional" and "non-volitional" attention. When we are studying a task, its saliency may be sustained not by its own tendency to remain salient but by our own volition to make it so. This is obviously not the same as the distinction between immediate and derivative attention, for although the objects of "immediate attention" always tend to become salient without our volition and may therefore be called objects of "non-volitional" attention, so also may objects of "derived" attention. The attraction of the prize may make the attention of the schoolboy to his Latin grammar "non-volitional," even although the interest in Latin grammar may have been originated by, and may frequently need to be reinforced by, volitional effort.

There is also a condition commonly described as "inattention" into which the mind tends to relax in fatigue or when it is entirely unoccupied with the demands of the outside world. In this condition no part of the mental field attains a high degree of saliency, and thoughts tend to follow each other in accordance with associative linkings and not (as normally) through their determination by conative contin-

uities. There is a marked difference between a mind in this condition and one which has, by a command or by the perception of an important outside object, been roused to preparedness to react.

We can best describe this difference by use of the word "alertness" for this general level of conscious processes. The inattentive or fatigued mind is in a condition of lowered alertness, while the mind of the person occupied with a salient train of thought, with an action, or simply in a state of preparedness to think or to act may be said to be in a condition of high alertness.

The lowest degree of alertness is the condition of sleep in which, although the sense organs are still capable of receiving stimulations and the efferent nerves of initiating movements, the customary response of conscious behaviour to received stimulation has disappeared. It is found that changes in alertness are accompanied by measurable bodily changes. The electrical resistance of the body is, for example, much less in the condition of preparedness to react to a stimulus, and is greater when alertness is lowered, and apparently attains a maximum in sleep.¹

¹ "The Causes of the Continuous Change of Resistance observed in Psycho-galvanic experiments," R. H. Thouless, *The British Journal of Psychology*, Vol. XVI., 1925.

CHAPTER VII.

RETENTIVENESS, ASSOCIATION, AND REPRODUCTION.

Attention and Retention.—Retentiveness is the most general name for the fact that prior experiences produce residual dispositions which determine subsequent experiences. In the present chapter, retentiveness will be considered especially in relation to the way in which it affects a recurrence of the same attention-process. By the same attention-process I mean renewed attention to the same total object.

The essential effect of attention is to make its object in some way better known. But its efficiency does not merely depend on its own intensity and duration. The nature of the object, as we have seen, is an important condition. You can make out the hand-writing of your friend Jones at a glance. But that of your friend Smith may not be clearly decipherable after prolonged and strenuous scrutiny.

Efficiency also depends on the amount of previous attention given to the same or similar objects. After long familiarity you may become able to decipher Smith's manuscript without delay or difficulty. The strokes, curves, and dots are no longer chaotic. They are at once so discriminated and grouped as to form recognisable words and sentences. Similarly, the seaman discerns the "loom of the land," where a landsman can descry nothing but an indefinite haze above the horizon line. Helen Keller, who lost the senses of sight and hearing in early infancy, can make out what a person is saying by feeling the motion of lips and throat. She can also recognise persons by the mere contact of their hands.

In all such cases the result of previous attention is retained and carried over into subsequent attention-processes having

the same or a partially similar object. The work which has already been done does not need to be done over again. The residual disposition enables us to start afresh where we previously left off.

Retentiveness is also essential to an attention-process while it is actually taking place. Take, for example, the intelligent utterance of a sentence. If, at the end of the sentence, the conscious attitude of the speaker were not determined by the residual effect of his experience in uttering the previous words, his psychical state would be the same as if he had not spoken the sentence at all. Something like this occurs in certain pathological cases. In a case of senile decay, which came under my own observation, a lady went on reading the same nursery rhymes almost interminably, evidently finding them as novel as ever on each repetition. In order that mental advance may take place, the disposition left behind by previous psychical process must continuously persist as the basis and starting-point of further progress.

In the process by which dispositions are formed they also acquire certain connections with each other which are called "Associations." We shall here consider only such associations as are acquired in the course of the same attention-process. Other questions relating to this topic will be dealt with when we come to treat of "trains of ideas."

In attending, we successively focus various features, aspects, and phases of our total object. When on a subsequent occasion we again notice some partial feature of the object, others emerge successively into the focus of attention. Such mental reinstatement is said to be due to association and the reinstatement itself is also called reproduction, revival, or recall. I have often attended to the letters of the alphabet in a certain order. The sight of the letters *A B C* now suggests to my mind the succeeding letters *D E F*. The letters *D E F* are said to be reproduced by association.

What is Association?—We must now determine more precisely what this term "Association" means. It is most important to bear in mind that it does not stand for any actual psychical process. Reproduction is an actual

psychical process, but association is not. Association is an acquired connection of dispositions, and like the dispositions connected, it is formed in course of conscious experience, and it is a condition determining subsequent conscious experience. But as the dispositions themselves fall outside of conscious experience, so their union falls outside of conscious experience. Both the dispositions and their associations persist when we are sound asleep.¹

I hear some one utter the words, "Sing a song of sixpence," and then stop short. Almost inevitably I recall the following words, "A pocketful of rye." What does this involve? I must have previously heard the words, "A pocketful of rye," and the previous hearing must have left behind it a disposition persisting through the interval of their absence from consciousness. There must also be a similarly persistent disposition left behind by a previous hearing of the words, "Sing a song of sixpence." Further, there must be an acquired connection or union of these dispositions, and this union or connection must also have persisted in the interval during which my mind was occupied with other things. The two dispositions must have remained united in one complex disposition capable of being re-excited as a whole by a recurrence of only a part of the experiences which concurred to produce it.

And there is a corresponding physiological side to all this. The dispositions are physiological as well as psychical dispositions, and their union is a physiological as well as a mental fact. We may use the term "psychophysical" as a name for the psychical and the physiological aspects taken conjointly. Association is an acquired psychophysical connection between psychophysical dispositions or between a psychophysical disposition and a purely physiological arrangement.

This second alternative is very important. It includes all cases of what may be called "motor association." The sight of a word may prompt me to pronounce it, as in reading aloud. This is due to a previously acquired connection

¹ The union of presentations in consciousness, through which associations are generated, should be distinguished from the associations themselves.

between the psychophysical disposition excited by the sight of the word and the special nervous and muscular arrangements for producing the movements of articulation. Motor associations are, as we shall see, of immense importance in our mental life—especially at the perceptual level. Learning to walk, to shoot, to fence, in general the acquirement of bodily aptitudes and dexterities, depends on the forming of appropriate motor associations.

How Associations are formed.—We have now to examine the conditions which determine the formation of associative connections during the course of a continuous attention-process. The main points to be considered are : (1) the degree of unity which belongs to the process ; (2) the nearness or remoteness in time of the presentations which successively emerge into the focus of attention ; (3) the order of the successive presentations ; (4) the frequency with which the attention-process is repeated.

(1) *The unity of the attention-process* depends on the unity of its total object. But this may vary very greatly in degree in different cases. There is a corresponding variation in the facility with which associations are formed and in their strength and persistence.

In trying to learn by heart a series of senseless syllables, the total object has a low degree of unity. The syllables are connected as being all articulate sounds and as forming a temporal series which is to be learned for a certain purpose. But their union is far looser than that of words combined in sentences so as to convey a connected meaning, and this unity becomes still more intimate if the words are arranged in rhythmic sequences, as in poetry.

Professor Ebbinghaus found that on the average he had to repeat a series of thirty-six syllables fifty-five times in order to say them over from memory without an error. He required from six to seven repetitions in the case of each stanza of Schiller's translation of the "Æneid." Each stanza contains on the average fifty-six words or groups of words with a relatively independent sense. Deducting articles, prepositions, and pronouns, from thirty-six to forty independent

words are left. Hence Ebbinghaus infers that his power of learning Schiller's verse is eight or nine times as great as his power of learning series of senseless syllables.

A comparison between the number of syllables in the stanza of poetry and in the nonsense series is not practicable. For in learning intelligible sentences the mere number of syllables seems to make virtually no difference. A sentence of twelve words of one syllable is learned in the same number of repetitions as a sentence of twelve words of two syllables.

Certain experiments on French school children are of interest here. The children had to write out after one hearing, sometimes a series of disconnected words, sometimes short sentences. Out of seven disconnected words they were able to reproduce only five on the average. Out of a sentence of thirty-eight words, divisible into seventeen groups with relatively independent meaning, they could reproduce fifteen such groups. Twenty-four such groups were reproduced out of a sentence containing twenty-eight, and consisting of seventy-eight words. In each case the parts retained were such as expressed the essential framework of meaning. Those omitted were in general more loosely connected with the unity of the whole : they consisted mainly of comparatively unessential amplification—ornamental epithets and the like.

This dropping out of insignificant links illustrates a general principle. *Ceteris paribus*, the most strongly associated dispositions correspond to those items which are most important to the general structure of the total object.

(2) This point is to be borne in mind in *considering the effect of proximity or contiguity*. According to the old view, which is still more or less current, the one indispensable condition for the formation of associative ties was simultaneity or immediate succession. This is certainly false. We are constantly doing what the school children did in the experiment referred to. In the process of recall we drop out details which are comparatively unimpressive or irrelevant to the dominant interest. The mind passes from one salient point to another, skipping over what is relatively insignificant. If this were not so, it would take us the whole of to-day to recall the events of yesterday.

None the less, contiguity is a very important condition. Other things equal, a presentation will reproduce presentations which have occurred simultaneously with or immediately subsequent to it, rather than others which were separated from it by an interval of time otherwise occupied. And it will reproduce those separate from it by a shorter interval rather than the more remote.

The importance of proximity is most conspicuous when the unity of the total object is loose, and when the successive items are approximately on the same level of interest. These conditions are fulfilled in the learning of series of unmeaning syllables. But even in this case, it has been indirectly demonstrated that associations are formed when the syllables are not immediately contiguous in time. The method followed is first to learn certain series so as to be able to repeat them without error and then to learn other series formed out of the first by regularly omitting every other syllable, or two syllables, or three syllables.

Thus if we represent a primary series by the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, etc., the corresponding derivative series might be 1, 3, 5, 7, 9, etc., or 1, 4, 6, 10, etc. New syllables were intended to make the derivative series of the same length as the primary. The number of repetitions required to learn the derivative sequences was then compared with the number required to learn the primary. It was found that in every case the derivative sequences required fewer repetitions than the primary. The saving was greatest when only single links were omitted and diminished rapidly and progressively for the omission of 2, 3, or 4 links. Various precautions and tests were used which exclude any doubt that the greater facility in learning the derivative series was due to associations between items more or less remote from each other in the primary series.

(3) The next condition which we have to consider is the *order of presentation*. It is often asserted that association does not work backward, or in other words, that presentations are only reproduced in the order in which they have been originally attended to. Undoubtedly, this is the prevailing tendency, and it is particularly strong where there has been frequent

repetition in the same order. Hence the great difficulty of saying the Lord's Prayer backwards. But we have here to do only with a predominant tendency and not with an absolute rule. It is shown by experimental evidence that when a series of nonsense syllables has been learnt by heart, a much fewer number of repetitions is needed to learn the same series in an inverted order. The backward working of association may also be of a more direct nature. A presentation may recall a prior link with which it is intimately connected, rather than a forward link with which it is more loosely connected.

There is a neat illustration of this in certain experiments with nonsense syllables alternately accented and unaccented in a trochaic rhythm. After a series had been learnt so that the subject could just reproduce it without error, some minutes were allowed to elapse. The experimenter then presented isolated syllables to the subject and required him to name the first syllables which they suggested. When the syllable shown was accented it almost always reproduced the next following unaccented syllable of the trochee. When it was unaccented it almost as frequently reproduced the previous accented syllable of the same trochee.

(4) *The effect of repetition* is well known, and it has already been incidentally illustrated. Its relative importance is greater as the interest is less intense and the unity of the total object less intimate. It has been found that repetitions more or less immediately following one another yield less enduring associations than those which are separated by considerable intervals of time. In learning a series of nonsense syllables, associations are less firmly established by twenty-four consecutive repetitions than by four repetitions a day continued for six days. This division again yields a less favourable result than two repetitions a day continued for twelve days. The conditions of the experiment show that the results can only be accounted for if we suppose that older associations are more strengthened by repetition than those which have been more recently formed.

The Forms of Reproduction.—We now pass from the conditions under which associations are formed to their effects

in conscious process. In other words, we have to consider the various forms of recall or reproduction. Of these we may distinguish three: (a) Free or explicit revival occurring directly. (b) Free or explicit reinstatement occurring indirectly through motor associations. (c) Nascent or implicit revival.

(a) In *free or explicit reproduction* the several items of previous experience emerge into consciousness with a mutual distinctness and independence, such as they possessed in their original occurrence. Where the revival is *direct* they take the form of mental images, copying actual sensations in their qualities and forms of combinations. In our previous illustration the words "A pocketful of rye" are recalled in this way. Each word is separately and successively heard by the mind's ear as it was originally by the bodily ear. Here the words are supposed to be merely mentally recalled by direct association with the foregoing words, "Sing a song of sixpence."

(b) But another alternative is possible. Preformed association might lead me straightway to utter the words aloud without preliminary mental rehearsal. In that case there would be free or explicit reinstatement. But it would take place indirectly through movements depending on *motor association*; and it would take the form of sensations produced anew, not of reproduced mental images. This form of free reinstatement is peculiarly characteristic of perceptual process as distinguished from trains of ideas.

(c) If we are to account fully for the influence of past experience on present thought and action we must lay emphasis on another form of reproduction distinct both from revival, in the form of a sequence of ideal representations, and from reinstatement through motor activity following the lines of preformed motor associations. It is an all-pervading fact of our mental life that past experience also works in a way which may be called *implicit*. Without being itself recalled in distinct detail, it invests the details which actually are presented at the moment with a certain relational significance, a sense of their meaning and bearings.

For instance, as I am now writing, what is present to my attentive consciousness in the way of sensation or mental imagery may be only one or two words as seen or mentally

heard and articulated ; but these sensations and images have for me a meaning which is not itself formulated in sensations, in images, not even in other words ; they have a relational import due to their preformed associations and to their place in the context of my discourse.

In general, the preacquired knowledge which determines our present thought is only to a relatively small extent present to consciousness in distinguishable detail. To a far larger extent it is operative implicitly. We are, for instance, constantly proceeding on what are called unconscious assumptions—assumptions which often are not formulated in consciousness until they are falsified.

Thus we speak to a man on the assumption that he is capable of hearing, and we only wake up to the fact that we are making an assumption when he turns out to be deaf. I may meet a friend and begin to talk to him on some political topic, taking for granted that he agrees with me ; I find that he does not, and only then does my implicit presupposition enter explicit consciousness. The fact that I am at present in Oxford and that it is vacation time colours my whole view of things and persistently determines my behaviour and my trains of ideas ; but I only rarely say to myself, "I am in Oxford and it is vacation time," or otherwise formulate these facts in consciousness. In signing a cheque I appreciate the significance of my act without calling to mind the successive details which constitute its significance, such as the presentation of the cheque by somebody, and the clerk paying out my money over the counter.

Mr. Clay, the author of an unduly neglected book, *The Alternative*, gives a very good example of an unconscious assumption. A waiter twice entered the room in which he was breakfasting by the same door and made his exit by another. Mr. Clay took what was in fact the same waiter for another, a twin brother. The general appearance of the building had led him to apprehend the room as having only one door ; but he had never formulated the judgment, "There is only one door," or indeed mentally raised the question in any form.

Implied revival enters into all recognition of a whole through some partial feature of it. Thus, when I hear the

words "Sing a song of sixpence," they come before my consciousness as belonging to a certain familiar context. They do so at once, before I actually recall the following words, and each of these, as I am in the act of reproducing it, is recognised as only a fragment of the same specific whole. My total impression would be very different if I were repeating Gray's "Elegy." For this kind of recognition it is not even necessary to be able to revive further details beyond those initially presented. I may recognise the whole nursery rhyme when I hear its first words without being able to call to mind the continuation. The continuation as heard in the past is implicitly operative in determining recognition, though it cannot be reinstated in detail. In such a case I am generally able to reject wrong continuations, either occurring to myself or suggested by others, and immediately to identify the right one when it is presented to me. This is a typical case. In general, whatever is given in detailed experience is apprehended as a fragment of a wider group or system which is not presented in determinate detail.

Thus suppose that I catch a glimpse of the back of a friend of mine as he is just disappearing round the corner of a street. What is explicitly presented as a sensuous datum is merely the fugitive and fragmentary view of my friend's back. This visual appearance is recognised, and I also at the same time recognise my friend by means of it. In part the recognition may consist in recalling mental images of his face or of the sound of his voice and the like. But before such detailed recall takes place, and also while it is in process of taking place, the object of the total experience has for me a distinctive peculiarity due to the resultant effect of previous experiences which are not at the moment present to my mind in detail. This resultant effect would have been very different if I had seen in the same way an enemy, or a creditor likely to prove importunate, or an acquaintance in whom I took no particular interest, although these might have presented a similar appearance to the eye.

I give a last illustration used in a University Extension Lecture. "If I say 'I have to catch a train at Sloane Square to go down to Essex Hall,' I only mention one train,

one square, and one building. But my assertion shades off into innumerable facts which are necessary to make it intelligible and true. It implies the existence of the underground railway, which implies that of London. It implies the reality of this building and of the meetings which we hold in it, of the University Extension System, and of my own life and habits as enabling me to take part in the work of that system. Only a part of this is in the focus of my attention ; but the whole is a continuous context, the parts of which are inseparable, and although I do not affirm the whole of it in so many words when I say that I am coming down here by train this evening, yet if any part of it was not presupposed, the rest would, so to speak, fall to pieces, *i.e.* would lose relations in the absence of which its meaning would be destroyed.”¹

Perceptual and Ideational Process.—The actual flow of mental life at all stages of development involves transition from implicit to relatively explicit reinstatement of past experience. We begin by apprehending a whole in its distinctionless totality, and then proceed to unfold its details. But this may take place in two fundamentally different ways. We may obtain anew a train of sensations by repeating a train of movements which has led to them in the past, or we may reproduce the distinct details of past experience by means of merely mental images.

Thus, a man who knows his way about a building may make this knowledge explicit either (1) by actually making his way from one part of the building to other parts, or (2) by mentally picturing or describing in words the relative position of the rooms, passages, staircases, etc. The distinction between these two methods of translating the implicit into the relatively explicit roughly corresponds to the distinction between perceptual and ideational process ; (1) is perceptual and (2) ideational. The nature of this distinction will be further explained in the next chapter.

¹ *Essentials of Logic*, by B. Bosanquet, pp. 33-34. I have freely adapted the passage quoted by alterations and omissions, so as to suit it to my own purpose, which is not quite the same as Mr. Bosanquet's.

CHAPTER VIII.

DEVELOPMENT OF CHILD.

In preceding chapters we have given some account of the general nature and conditions of conscious process. We now pass to the consideration of the successive stages of mental development. By way of introduction to this part of our subject, it is convenient to give some indication of the general course of mental development in the child.

Child's Development.—During the first year the child's mental progress consists almost wholly in acquiring motor associations by which he is enabled to adapt his movements in an increasingly purposeful and systematic way to the things and occurrences which affect his senses. He thus obtains a more and more extensive and effective control over the order and nature of his sense-experiences, seeking or avoiding them in advance, instead of passively receiving them as they happen to occur. It is through a kind of experimental process that this takes place.

Movements of the body, limbs, and organs of sense are at first made at random, or comparatively at random. But there is a constant tendency to persist in those movements and motor attitudes which yield satisfactory experiences, and to renew them when similar conditions recur; on the other hand, those movements and attitudes which yield unsatisfactory experiences, tend to be discontinued at the time of their occurrence and to be suppressed on subsequent similar occasions. By the working of this law of Subjective Selection, as it is called, relatively blind and undirected activities become gradually guided into definite tracks, each advance paving the way for further progress.

It is to be noted that the continuance of an agreeable

experience leads to satiety or fatigue, and so to change of behaviour. Besides this, while the agreeable interest continues it may be enhanced by varying the motor activity in specific ways, without altering its general nature. Hence there is always present in some degree a subjective tendency to variation which yields material for subjective selection.

The child is, at the outset, mainly occupied in learning to see and touch. By constant practice in adjusting the movements of his eyes and hands, he obtains a gradually increasing command over the order of his visual and tactful sensation. There is, to begin with, a certain tendency, probably congenital, to turn the head, so as to bring into full view bright or obtrusively moving surfaces, and to stare at them. Let us suppose that the child is staring at a bright window and that the nurse turns him away from it. He begins to cry. If the nurse turns him toward the window again, he ceases crying and wears an appearance of contentment. But if he is not passively turned again so as to face the light, his discontent will continue and will manifest itself in restless movements of the head, eyes, and body.

Among these movements one may occur which restores the previous pleasant experience. Turning his head far enough, in either direction, he sees again the light of the window. When this success, initially due to accident, has been repeated a certain number of times on similar occasions, the required movements will be made more readily, precisely, and decidedly, other movements being cut short or suppressed altogether. The child in the nurse's arms, instead of merely kicking with his legs, and flapping his hands, will roll his eyes, not up and down, but to the left or right, until he catches sight of the window.

A more complex development is reached when the child learns to turn, not his head, but his eyes, from one object to another and back again, gazing alternately at each. Miss Shinn gives a good instance. "On the twenty-fifth day, as the baby lay . . . in her grandmother's lap, staring at her face with an appearance of attention, . . . I leaned down close beside her, so as to bring my face into the line of vision. She turned her eyes to me with the same appearance of attention,

even *effort* in slight tension of brows and lips ; then back to her grandmother's face ; again to mine ; so, several times.''¹ Here the eyes actively seek each object in turn in a purposeful and systematic way.

At a later stage the child begins actively to look about in all directions in order to find what is to be seen. This attitude is well described by Miss Shinn. "In the fifth week, when held up against my shoulder, she would straighten up her head to see around, and thereafter looking about, *as if to see what she could see*, became more and more her habit."² In this way, a mastery is gradually acquired of that complex system of ocular movements by which the adult brings successively into distinct vision, by definite and orderly transitions, one object after another or different parts and aspects of the same object.

There is a similar gradual progress in acquiring the power to follow a moving object with the eyes. In a very jerky and imperfect way, the child may do this within the first week, as a consequence of the tendency to turn towards bright surfaces. The bright surface draws the eye after it. Later on, moving objects are followed up in a more purposeful and systematic way, and also more continuously.³ But at first the eye can keep pace only with slow and uniform motions of large or otherwise conspicuous objects. It is only by long practice that the child acquires the power of following motions which are relatively rapid or minute, or such as present complex variations in speed and direction.

During this development of active sight, active touch also goes through a similar course of self-education, though this is at first of a much more limited and rudimentary character. The hand by tentative groping gradually learns the system of movements required for obtaining touch-sensations in definite order by contact with the various parts of the body and with

¹ "University of California Studies," Vol. I., pl. I, *Notes on the Development of a Child*, by Millicent Washburn Shinn. Berkeley, 1893, p. 14.

² *Ibid.* p. 14. Miss Shinn's whole account of the development of sight and touch is excellent.

³ Never quite continuously. Even in adults the process is not quite continuous.

other objects having a sufficiently constant situation within reach, *e.g.* face and clothes of the person holding it. The hand also learns to grasp what it touches. Clasping what is placed in the palm of the hand is a congenital, not an acquired movement. What has to be learned is the right use of thumb and fingers and the appropriate action of grasping things which touch other parts of the hand than the palm. At an early stage only those objects are seized which touch the fingers conveniently in front. Turning the hand so as to grasp what touches the back of it is a later development.

The education of sight and the education of touch may go on independently of each other for as long as three or four months. Afterwards a confluence of the two streams of development begins to take place. The hand is looked at as it moves and grasps with more and more attention. But at first it is only looked at as anything else might be looked at. It is only very gradually that the eye comes to guide the movements of the hand. At first the hand does not follow the eye, but only the eye the hand. Visual guidance becomes possible only as the child gradually learns the connection between varying positions of the visible appearance of the hand in the field of view and the touch-sensations of the hand itself together with the series of muscle, joint, and tendon sensations which accompany its movements.

At first the visual guidance is exceedingly vague. Sight seems merely to give the suggestion that there is something somewhere to be grasped ; but the actual finding of the object depends mainly on tentative groping. "About the 113th day" the baby studied by Miss Shinn "would not aim a grasp at the object under visual guidance, but would look at it, moving her hands vaguely, as if feeling for it, then strike them toward it, with fingers open, till they touched and then grasped." Gradually sight comes to exercise more effective control, so that the tentative groping acquires decision and precision ; at the same time, the position of fingers and thumb is prearranged for grasping before actual contact. Thus by a long process of experiment, leading through many transitional stages, the child becomes able to aim a grasp at any object within reach, readily and accurately.

As this process is going on there is also a gradual increase of skill in exploring and variously manipulating the things which are grasped. This opens out a multitude of fresh sources of interest and lines of experimental activity. The thing which the hand grasps may be explored in detail with the fingers and thumb ; it may be held up and turned round for inspection by the eye ; it may be set rolling ; it may be dropped or flung on the table or floor ; it may be crushed or crumpled or torn or pulled to pieces. If it is hollow it may be filled or emptied. If it is elastic it may be made to rebound. The child in this phase of his development is often especially interested in fitting one thing into another, as a cork into a bottle or a key into a lock. He may also find a rich source of satisfaction in scribbling with a pencil.

We need only refer in passing to the acquirement of the various modes of locomotion, such as rolling, creeping, sitting, walking, running, and climbing. These motor adjustments develop in the same gradual way as grasping and manipulation. They develop by a gradual transition from relatively tentative, vacillating, and random motor activity to relatively decided, fixed, and orderly modes of behaviour. Throughout, the experimental activity is prompted by interest agreeable or disagreeable. It is progressively moulded into shape by the gradual repression of movements which lead to unsatisfactory, and the retention and repetition of those which lead to satisfactory, results. The new experiences which emerge in these processes continually open out new sources of interest, leading to new lines of experiment. The results of past process form a basis for subsequent development.

The child's progress, so far as we have hitherto considered it, has been almost exclusively on the *Perceptual* level. It has involved only direct adjustments in the way of bodily movements to things and situations actually present to the senses. But as the child learns to speak and to understand what is said to it, another form of mental activity emerges, and gradually assumes more and more importance. In this mental images are substituted for actual sensation, and fulfil a function partly analogous, though with most significant differences. Sights seen with the mind's eye take the place

of sights seen with the bodily eye. Sounds heard with the mind's ear take the place of sounds heard with the bodily ear. Among these images are included mental revivals of words as heard and articulated. And words as actually spoken and heard fulfil an analogous function ; for they are means of directing attention to objects which are not actually present to the senses. Both words and mental images have a meaning due to preformed associations working in the way of implicit revival. They are representations of objects. So considered they are called ideas, and the processes into which they enter are called ideational.

The transition from perceptual to ideational process is gradual. Ideas probably occur at first in a sporadic way, and serve merely to supplement perception in guiding the course of motor activity as it is actually proceeding. As the ideational process becomes more independent of perceptual, lines of action begin to be planned, projected, or contrived in the way of ideal representation, before they are put in execution. There is clear evidence of this when the child in dealing with a certain situation utilises experiences which have been acquired in different and disconnected circumstances.

Thus a little boy of twenty months has learned that he can make an organ grinder play by giving him a penny. The penny is usually supplied by his mother. But on one occasion his mother cannot find the coin and the organ grinder is walking away. The child exclaims, "Pem, pem" (penny, penny). He then goes to a little box containing various articles which he is in the habit of using as toys, and among these a penny. He finds the penny and brings it to give to the organ grinder. This is an ideal combination leading to action which could hardly have resulted from that way of learning by experience which is characteristic of merely perceptual process ; for he has never before taken a penny from the box to give to the organ grinder. The box and its contents have quite different and disconnected associations. The mental combination made by the child is one which has never occurred in its previous experience. The word "pem" directed his thoughts to the penny in the box, and he then

ideally brings the thought of this penny to bear on the present situation.

As the child grows older, ideal anticipation of the future and ideal recall of the past largely take the place of direct adaptation to circumstances immediately present. A capacity thus arises for prearranging behaviour in adaptation to conditions which have not yet occurred, and for mentally constructing ideal combinations corresponding to nothing which has actually been perceived. For a long time, such ideational process, like prior and concomitant perceptual process, takes to a large extent the form of play. It is to a very large extent exercised merely for its own intrinsic interest rather than for the attainment of ulterior ends. The imitative and dramatic plays of children mainly consist in ideal construction. The same holds good of the little romances which they invent for themselves. The child mentally experiments with his own ideas for his own amusement, as at an earlier stage he experiments in manipulating the objects which he grasps in his hands.

Thus he or she imagines a life history for the doll or tin soldier. The doll, for instance, is put to bed, made to sleep, fed, taken out in its perambulator, reproved and slapped when naughty, praised and petted when good. Such ideal construction becomes still more complex and self-sustaining in the boy's mimic battles with tin soldiers or in the girl's tea-parties for her doll, in which ordinary tea has to be pounded into miniature tea.

Such playful exercise prepares the way for the more serious work of ideal construction in the business of life. Through ideal construction, playful and serious, the child learns to connect the detached data of perception in a more or less systematic whole, as partial features of a single world. At the same time his interests cease to take the form of detached and transient impulses; immediate and particular ends become subordinated to more remote and general ends. Thus a more or less unified plan of life emerges. In the whole process ideational activity, like perceptual, is throughout a development of interest, and serves in its turn to open out new sources of interest, which again supply fresh motives for further activity.

Reviewing this slight sketch of the mental progress of the child, we note : (1) That it has two broadly distinguishable stages, the perceptual and the ideational. The first of these precedes the second and persists along with it. (2) That in both stages the cognitive side of our nature co-operates in the most intimate manner with what I have called "Interest," including under this head everything in the nature of striving, desiring, being pleased or the reverse, and all the varieties of emotional attitude. The whole process is one in which interest moves towards its own satisfaction ; but this is possible only by finding out how to satisfy itself,—in other words, it is possible only through the development of cognition.

Imitation.—Towards the end of the first year imitation begins to play a conspicuous part in the child's development. Subsequently it becomes a factor of very great importance.

The term "imitation" is, however, ambiguous. There are two forms of imitative activity which must be carefully distinguished. One of these, *deliberate* imitation, is distinctive of ideational process. The other, spontaneous imitation, is found also at the perceptual level, though it becomes more varied and complex as the flow of ideas becomes more varied and complex.

Deliberate imitation essentially involves an ideal combination. The subject starts with the idea of a certain end to be attained. Some one else is seen to attain this end by a certain action. This action is then ideally represented as a means of attaining the end, and it is performed for the sake of the end, not for its own sake. A child, let us say, is trying in vain to open a drawer in order to get toys or sweetmeats which the drawer contains. I show him how to open the drawer by turning a key, closing and locking it again. He then attempts to turn the key himself. So far he does this merely as a means of opening the drawer and getting the toys or sweetmeats, the imitation is deliberate, not spontaneous.

In the spontaneous form of imitation, the subject attempts to repeat some one else's action, simply because he finds it intrinsically attractive or impressive, and not for the attain-

ment of any ulterior end. At that stage in the child's development in which he is keenly interested in manipulating objects, the sight of my turning the key would be likely to attract his attention vividly, apart from any reference to an ulterior result. He would then tend to imitate the action spontaneously, and not as a means to an end. This spontaneous imitation does not necessarily involve ideas. The mere perception of your beating the table with your hands or shaking your head is enough to prompt the child of about twelve months to beat the table with his own hands or shake his own head.

It is this spontaneous imitation which dominates the dramatic play of children. They are interested in the doings of their elders directly, and imitate them from this motive, and not as a means to any further end.

Both spontaneous and deliberate imitation presuppose a motor association between the perception or idea of the act to be imitated and more or less similar movements which the child has already learned to perform. Hence the more he has already learned to do, the more he can do in the way of imitation, and the less he has already learned to do, the less he can do in the way of imitation. At the outset the child's imitative actions tend rather to resemble his own previous performances than his model. But the model has a modifying influence which becomes more and more marked in course of time. The child has not only learned certain particular movements, he has also learned to vary his movement in certain general ways, and he may thus make a particular variation in response to the model, which he has not made before.

He has learned, for instance, how to stretch out his arm with varying degrees of force and rapidity. He sees you stretch out your arm very rapidly and forcibly, and in imitating you he may stretch out his own arm more rapidly and forcibly than he ever did before. He may also be led to combine and co-adjust movements in the process of imitating, as he has never previously combined and coadjusted them. Thus he is able to imitate, for the first time, the action of his nurse in throwing a ball, only because he has already learned to hold things in his hand, to let them drop, and to stretch out his arm more or

less forcibly. But the combination of first grasping the ball, then stretching out his arm forcibly and rapidly, then letting the ball go, is new to him. Even if he is successful in so combining his movements, his action may repeat only very imperfectly that of his nurse. But accidental variations may occur which assimilate his behaviour more closely to his model, and these variations will tend to be maintained and repeated by subjective selection.

The deliberate and persistent endeavour to correct deviations from the model by reiterated trial involves ideational process. It depends on comparison and contrast between the result of the imitative process and that which was to be imitated. The idea of a successful imitation is set before the mind as an end to be attained, and the actual attempts to copy the model are regarded as means. To this extent the imitative process becomes deliberate even when its primary motive is the intrinsic interest of the action imitated.

CHAPTER IX.

PERCEPTION OF EXTERNAL OBJECTS AND OF THE SELF.

The External World.—We seem to live in a world of “things” which have to each other relationships of position, distance, and direction. This system of relationships, thought of apart from the things themselves between which the relationships hold, is called “space.” The “things” are perceptible to us through their effects on our sense organs as forms, colours, resistances to our movements, etc., *i.e.* through their sensible qualities. Changes in the positions and in the sensible qualities of things form what may be called the series of “events,” which have between themselves the relationships of succession and duration. This system of relationships, thought of apart from the events themselves, is called “time.”

We can take it for granted that there are really objects and events which make up the world around us, and that our perception of spatial and temporal relationships is based on actually existing relationships between these. Yet it is true that our perception of things, our intuition of them as belonging to a system of external reality, and our intuition of a space and time in which they exist, are not mere objective recordings of these actually existing things and relationships. They have, on the contrary, a mental history. Things, events, and temporal and spatial relationships as they appear to us are products both of external reality and of our ways of perceiving. The influence of our ways of perceiving may thus, from one point of view, be regarded as a veil of subjectivity partially hiding from us the external world as it really is.

The object of physical science is to strip this veil of subjectivity from the objects and relations of perception, and to

describe them in a way that would be valid for all methods of recording, and that is quite independent not only of the psychology of the observer but also of all particular conditions (such as his position and velocity). The raw material of physical science is, of course, always actual perceptions of observers taken under particular conditions. But it is possible by the use of instruments of precision, by objective methods of recording (such as the camera), and by mathematical analysis of the data gained to attain ever more real objectivity of scientific description and increasing independence of the particular circumstances of the observer.

It is now a commonplace that this scientific analysis reveals to us objects and events and a system of relations between them very different from the things and from the space and time of crude experience. A few years ago it was supposed that the atoms of chemistry existing in an aether occupying a three-dimensional space and taking part in events succeeding each other in a single stream of time was the final objective reality which was left when all that was subjective and individual in actual perception was stripped away. We now know that even this physical system contained much that did not belong to the world of physical science and that something even further from the world of perception was the ultimate core of objectivity which physical analysis revealed.

In his special theory of relativity, Einstein showed that a point was not completely determined by reference to its position in a three-dimensional space, or an instant by its position in a one-dimensional stream of time, and that instead we must substitute the conception of point-instants (or point-events) uniquely determined by reference only to their positions both in space and time. This was expressed by Minkowski as a four-dimensional continuum of point-events in which the four dimensions are the three dimensions of space and the one dimension of time. In his general theory of relativity, Einstein made the further reduction of matter to a departure of space from Euclidean properties.

This is, of course, only a further example of the same reduction as is familiar to us in the case of sensible qualities. When we say that an object is yellow, the objective fact of

physical science is that it is emitting a group of electro-magnetic waves grouped about the length of 5.5×10^{-5} cm. When we hear a note of a certain pitch, the objective fact is that a vibrating body is making longitudinal vibrations in the air which (under the particular conditions of our observations) strike on the ear a certain number of times per second.

Kant taught that space and time were not objective realities but modes of our perceiving. Schopenhauer made a further step in the same direction when he opened *The World as Will and Idea* with the statement "The world is my idea." There is a popular view of modern physical research that it is a confirmation of this extreme subjectivism. On this view, Einstein has merely by mathematical methods laboriously rediscovered what was known to Kant. This is not, however, what Einstein himself believes. He does not maintain that all spatio-temporal relationship and all external reality are subjectively determined, but merely that much that was subjective still remained in what the Newtonian physicists regarded as the truly objective external world. His contribution to physical science has been to show how even this veil of subjectivity and relativity can be stripped off, and to demonstrate that what is then left is truly objective —the same for all observers and for all methods of recording.

The above excursion into physics is necessary in order to make clear the opposite problems of psychology. The objective reality of Einstein is something far removed from our perceived world of things at rest or in motion, with its succession of changing colours and sounds. The problem of psychology is how, out of the reaction between the perceiving organism and the objective world of physics, is built up this world of perception.

A perceived object is clearly something quite different from a collection of protons surrounded by moving electrons, the sensible quality of colour is different from electro-magnetic radiation, while perceived position and time are different from the mathematical relationships between point-events distinguished by Einstein. Let us call the object as perceived a "thing," and recognise that a thing is a mental construction from an externally existing reality. It is with this process of

mental construction that we are, as psychologists, concerned. Similarly we must distinguish between space and time as mental constructions and the external orders on which these are based. These mental constructions we may call psychological space and time to distinguish them from physical space and time (or more correctly from physical space-time).

There are in this matter two errors against which we must be on our guard—the tendency to attribute to physical space and time properties which belong only to the mental constructions of space and time, and the opposite error of attributing the properties of physical space-time to psychological space and time. The former error is deep-rooted in popular thought. An example is to be found in the pre-Einstein conception of a single stream of physical time entirely separable from the three dimensions of space—a conception which is entirely valid for time as experienced. A similar error underlies our natural conviction that the distance between two points is an unambiguous physical conception.

While errors of this kind are very common and are indeed characteristic of all crude conceptions of space and time, their importance lies in their bearing on physical theory. The opposite kind of error is the serious one in psychology—the attribution of the properties of physical space and time to space and time as experienced. A good example of this is to be found in the common idea that we live in an instantaneous present of no duration. In fact, as William James pointed out, the dimensionless present is entirely a product of mathematical analysis and has no counterpart in experience. The present of our experience (or *specious present*) contains not only the perception due to the physically present stimulation of sense organs but also the persistent sensory impressions of immediately past stimulations, the fading primary memory images of those recently past (physically) and the conations directed towards the immediate physical future. The present of time as experienced is, as William James says, “no knife-edge, but a saddle-back with a certain breadth of its own.” The common opinion that it is a knife-edge is simply the result of reading into time as experienced the properties which really belong to physical time.

The Perception of Space.—We shall here discuss briefly some of the psychological problems connected with the perception of external things and of their spatial relationships. The analogous problems of the perception of time relationships, we shall leave to more advanced text-books.¹ Our first problem is that of space.

Let us consider the characters of the visual field as it presents itself to an observer at any moment. These characters are not correctly expressed by saying that it is three dimensional. This is a mathematical property which has little meaning for the visual field of immediate experience. What we see is an extended field with directional properties (the direction of up-and-down seems different from that of right and left) and with the property of depth (*i.e.* the objects in it appear to be not on a flat field but to be at different distances from the observer). Our account of psychological space must begin then with an account of the genesis of visual extension, of up-and-downness, and of depth.

The visual field as seen at a particular moment is something more elementary than visual space. Let us call it a *visual perspective*. As the body moves to different positions it experiences different visual perspectives in which the same objects are seen in various depth relationships. It is from the blending of these different perspectives that the visual element of our intuition of space arises.

The first property of the visual field which demands discussion is the fact that we see an extended and continuous field. It might be thought at first that this was sufficiently explained by the fact that the retina is an extended surface and that the stimuli giving us different parts of the visual field fall on different parts of the retina, and that those giving us neighbouring parts of the visual field fall on neighbouring parts of the retina. The extension and continuity of the field of visual perception would thus merely be the direct consequence of the extension and continuity of the optical image falling on the retina.

A little reflection will show, however, that this cannot be the whole answer. The sense organs for smell are also

¹Stout, *Manual of Psychology*, Fifth Edition, Book III., Part II., Chap. V.

distributed over a surface, but there is no property of extension in the sensations we receive from them. A real extension of the sense organ cannot therefore in itself be a sufficient condition for the perception of extension. It is also necessary that the different elements of the sense organ should produce sensations differing specifically in some respect, and that these differences should be directly apprehended in our experience as differences in areal position of the objects perceived. These properties of visual sensations which differ in different parts of the retina are called "local signs."

The perception of visual extension is then only made possible by four conditions : (1) the lens of the eye produces an optical image on the retina so that different parts of the seen area produce stimulation of different retinal cones which produce excitations in different nerve fibres going to the cerebral cortex ; (2) the sensations concomitant with the excitation of these different nerve fibres have different local signs ; (3) these differences in local signature are immediately apprehended as differences in position of the perceived external objects ; (4) these differences in position are perceived as a continuous extension in such a way that sensations from neighbouring retinal points are referred to neighbouring elements in the extension of the perceived perspective.

The second property of the visual field which we must discuss is the distinction between up and down. If we look at such an object as a vase standing on its base it appears to us to be "upright." The open top of the vase appears to be "above" the base. The relationship of the top of the vase to its bottom seems to perception to be fundamentally different from the relationship of the bottom to the top—a difference which does not appear between the relationships of right to left and left to right. If the vase is tilted at a small angle to the upright line a new property of "leaning over" appears in the perception. This upright line is the one to which all directions in the visual field are normally referred.

Although this upright line is the one in which the axis of the body is normally held, it is found that the actual position of the body does not supply the up-and-down line of reference. If we lie down on one side the line of reference for external

objects is unchanged. Upright objects still appear to be upright, we ourselves appear to be leaning over.

There are, however, conditions under which the up-and-down line of reference is changed, and a study of these gives us a clue to the psychological origin of this line. Although the direction of the axis of the body is changed when we lie down, the direction of the gravitational forces acting on the body is unaltered. It is possible, however, to arrange an experiment in which both the direction of the axis of the body and of the downward forces acting on it are altered. It is then found that the up-and-down line of reference is also altered. One of the best ways of noticing this is by looking over the side of an aeroplane when it is making a spiral dive. The body then makes an angle to the gravitational upright and the downward forces acting on the body (compounded of gravitation and of the centrifugal forces resulting from the circular motion) act in the same line as the axis of the body. On looking at the ground it is found to appear no longer horizontal but to lean over like the side of a mountain. The up-and-down line of reference has been tilted in the same direction as the change in the line of the downward forces.

Further observation shows, however, that the wings of the aeroplane also appear not to be horizontal but to be inclined at an angle opposite to that of the earth. This can only mean that the new up-and-down line of reference has not tilted far enough to be along the line of the forces acting on the body, but is a compromise between this line and the line perpendicular to the earth's surface. This can be verified if the direction of the familiar horizontal and vertical lines surrounding the observer be altered while the direction of the downward forces remains unchanged. It is found that this also results in a shift of the up-and-down line of reference so that it takes up a new position which is a compromise between the direction indicated by the gravitational forces and that indicated by these lines.

When standing in the cabin of a boat, for example, in a stormy sea, the rolling of the ship tilts the lines of the floor, doors, etc., of the cabin, while the force of gravitation still acts directly downwards on the body. The body automatically

takes up a position in what appears to be the true upright line. This, however, is not the true upright but is a compromise between this and the direction of the vertical lines of the cabin, so the body does not move far enough and the inexperienced sailor staggers in the direction of the roll of the ship. The vertical lines of the cabin appear to him to be tilted, but not so far as they actually are. If he watches an experienced sailor standing in the same cabin, he will find that at the point of maximum roll the sailor appears to have leaned over too far, he has leaned over beyond the apparent upright of perception to the true upright of the line of gravitational force.

A more striking example of this was supplied by a ship exploring in the Antarctic which was frozen for the winter in an inclined position. The ship's carpenters were required to saw down the legs of the tables on one side so that their surfaces were horizontal. This was done by eye, and the result was that the surfaces were made perpendicular to the perceived upright line which was part way between the actual upright and that shown by the sides and floor of the cabin. The carpenters sawed off some more of the legs until the tables appeared to be leaning over in the opposite direction to the tilt of the ship. Still, however, they had not sawn off enough to reach the true horizontal, so when a ball was placed on the surface of the table it appeared to roll off in an uphill direction.

Apart from such unusual conditions, the forces acting through the body, and the familiar lines of floors and walls, appear to indicate the same upright line. Moreover, the direction of this upright remains the same in all perspectives, *i.e.* alteration of the position of the body does not make any difference to which parts of objects appear above other parts and which below, although it does reverse other space relationships such as those of right and left. The intuition of visual space which results from the combination of different perspectives tends, therefore, to retain this distinction of up and down as an absolute one. No such distinction is, of course, valid in the space of physics, and the constant tendency of the mind to refer to the space of physics properties which belong

only to space as perceived makes difficult the elimination of this character from the conception of space. Children find it difficult to realise, for example, that people in Australia are not walking "upside down" like flies on the ceiling. This difficulty was no doubt important in the history of thought as one of the factors which made difficult the acceptance of the theory that the earth was spherical.

The third property of the visual field which we mentioned was that of depth. Objects are not seen as if at the retina where the visual stimulation takes place, but are "projected" to various distances. Two psychological problems present themselves. First, what are the visual data from which this intuition of depth is built up, and secondly how do these data come to be apprehended as depth relationships. The second of these problems must be left for discussion when we come to the motor elements in space perception; the first alone will concern us now.

It cannot be doubted that a vital part in the perception of depth is played by the arrangement of our two eyes, so that a large part of the visual field is seen by both from slightly different points of view. When we "look at" an object we converge the two eyes so that the optical image of the object in both eyes falls on the most sensitive portion of the retina or "fovea centralis." Descartes therefore suggested that the perception of depth came from our feeling of the degree of convergence of the eyes. If they were much converged we inferred that we were looking at a near object, while if the convergence was slight we inferred that the object was proportionally distant.

This was a brilliant guess, but experiment has shown that it needs considerable modification. If, by means of a stereoscope, we reproduce the conditions of binocular vision, it is found that instantaneous illumination of the stereoscopic photograph does not destroy the appearance of depth although the possibility of movements of convergence of the eyes is entirely removed. Also it appears that we are very insensitive to movement of the eyeball in its socket, for in a dark room it is found that involuntary movements of the eyeballs take place which can neither be detected nor controlled.

The essential factor in binocular vision appears to be the disparateness of the local signs of the points on the two retinae which receive the optical image of an object nearer to the body or more distant from it than the object which is being looked at. When we look at an object its image falls on the *fovea centralis* of each retina. This spot has the same local sign on each retina. Such pairs of points on the two retinae are called "identical points." Any two points on the two retinae at the same distance and in the same direction from the foveae are similarly identical points.

If now we are looking at an object and we consider the position on the two retinae which will be occupied by the optical image of an object in the same line from the head but at a different distance from it, we see that it will not fall on identical points of the two retinae. If the object is nearer to us than what we are looking at, its image will fall on a spot to the right of the *fovea centralis* of the right retina and to the left of that of the left retina. Similarly if the object is further from us than the one we are looking at, the two images fall on the nasal side of the *fovea centralis* of both retinae.

From what we know of local signature we should expect, therefore, that an object further from or nearer to us than the object we are looking at should give us the experience of two objects differing in position. In fact, such "double images" are only obtained when we deliberately take up the unusual attitude of looking at one object and attending to the perception of another at a different distance from the head. In our ordinary visual perception such double images do not appear; the varying disparateness of local signature of the images of different objects produces instead the perception of varying distances from the head. It is this and not the sensations connected with the varying degrees of convergence of the eyes which is the primary factor in binocular depth perception.

The different degrees and direction of the disparateness of the optical images of different objects on the two retinae is then the principal visual factor that produces the perception of the differing distances of objects. We must not think of

the perception of distance as an inference from the disparateness of optical images or as a judgment. The perception of distance is as immediate as the perception of visual extension. The disparateness of the retinal images is the physiological fact which gives rise to the experience of depth perception.

The disparateness of retinal images is not, however, the sole visual indicator of depth. The visual field appears to have depth when perceived with one eye. A picture also may have the character of depth. Moreover, reversal of the pictures in a stereoscopic slide, although it reverses the condition of disparateness, only produces reversal of depth relationships if very simple geometrical designs are used. In pictures, in monocular vision, and even in reversed stereoscopic slides, there are a large number of secondary indications of depth which can produce a perception of depth as immediate and as solid as that of binocular vision. Such indications are provided for example, by the fact that near objects obscure parts of more distant objects lying in the same direction, by the haziness of outline of distant objects, by the apparent convergence of parallel lines, by the relative sizes of known objects at different distances, and so on. These indications may themselves suffice to produce the perception of depth when the indication by disparity of retinal images is absent, or even to inhibit the normal results of the disparity of retinal images if it tends to indicate a set of distance relationships contradicted by the secondary indicators (as, for example, when the positions of the two pictures in a stereoscopic slide are reversed).

Our intuition of space is not, however, the product of our visual experience alone. The cutaneous sensations also have differences of local signature and contact of a penny with the skin gives an experience of extension just as does areal stimulation of the retina. The most important additional elements in the building up of our intuition of space are those provided by the sensations from muscles and joints in explorations by the hand and by the movements of the whole body. The element provided by experiences of this order may be called the "motor element" in space perception.

Indeed, it is easy to see, as was pointed out long ago by Berkeley, that without motor experience important elements

in visual space perception would have no meaning. If, for example, we were immovably rooted to the ground like corals, even though we had the same visual sensations as at present, they could not give us the perception of depth. Some objects would give us disparate images on the nasal side of identical points, while others would give disparate images on the temporal side of identical points, but this disparateness could not mean distance from or nearness to us unless there were also the possibility of the experience of longer or shorter translatory movements of the body or of exploratory movements of the hands in order to produce the experience of contact. Translatory movements of the body are also necessary to produce the different visual perspectives whose combination gives us the single visual space.

It is clear that we must not think of visual and motor space as two separate intuitions which are developed separately and are afterwards combined. Visual, motor, and other spatial forms of experience are all occurring together from the beginning. The intuition of space which grows up is the combined product of all spatial experiences.

The Perception of External Things.—The space around us appears to contain "things." These appear to be external to ourselves, and their existence seems independent of our mental attitudes. The whole system of things is the system of external reality.

The perception of any thing involves grouping of experiences belonging to different departments of sensation. The clock whose surface can be explored by movements of the hands is identified with the clock which can be seen, and is also identified with the source of the ticking which is heard. This identification takes place very early in life. During the first year of a baby's life, it will be found that the hearing of a new noise is followed by movements of the eyes until the visual object which is the source of the noise is found. Identification of visual and motor objects appears to be even earlier, for as soon as directed movement of the hands is possible at all, grasping or repelling movements are made towards objects visually perceived.

The things which are revealed to us in this way by our sense organs have a special significance both for experience and behaviour. Indeed, it seems reasonable to maintain that it is our apprehension of this significance which is our intuition of thinghood.

While our perceptual experience of external things is partially dependent on our bodily adjustments (for it is modified by our movement and disappears altogether if we shut our eyes or walk away), it also contains an element independent of our own adjustments. If we put our bodies in the right positions and have the necessary lighting, etc., we shall always perceive an external object. The perception does not depend on our expectation or on any other mental attitude. Also, although its appearances change in different perspectives, these appearances form a continuous series which we can attribute to a single object. Moreover, external objects tend to persist in time. Even when we are not seeing or touching them, it remains possible to do so if we put ourselves in the right position for doing so. An external object is a permanent possibility of perception. In all these respects perceptions differ from those kinds of experience (such as mental images) which are not indicators of anything external.

Still more important for the characterisation of external objects is their significance for behaviour. Mental life was evolved in an environment of objects some of which it was necessary to seek, while others it was necessary to avoid. At its beginning the mental side of life was an instrument for more efficient behaviour of seeking and avoiding. Thus the behaviour appropriate to external reality formed the background on which consciousness developed. Primarily a real object is one that requires from us motor adaptation; we must walk round a chair if we are not to bark our shins against it; if we push against it we get the experience of resisted motor effort. Our awareness of the behaviour necessities for motor adaptation towards external objects gives us the primary meaning of the word "real." It is not that we begin with a knowledge of what the word "real" means and by laborious experiments in pushing and perceiving find

out that external objects are real and that the apparent objects of our mental images are not. Our mental life begins in a world of objects requiring motor adaptation and our awareness of this necessity for motor adaptation (or our "sense of reality") is fundamental in our mental life before it is a distinct concept, and probably before disappointed expectation and mental imagery force us to recognise that there are other things which are not real.

An ink-pot, a desk, a tree or a leaf are named, apprehended and thought about as single things. If an object is a single unit in its demands on our behaviour or in the conditions of its perception it tends to become for our experience a single thing. Such separation into single things may have good physical foundation. An ink-pot, for example, is physically separable from the desk on which it stands. On the other hand, a glass of water is a single thing for experience although, according to modern theories of evaporation, there is a constant interchange of molecules from the water to the surrounding air and from the water vapour of the air to the liquid water. Similarly, a living body is a single thing persisting through time because it moves and behaves as a single unit although physically the matter of which it is composed is continually being cast off and renewed. A single thing for experience may thus have no physical singleness.

In the same way, a more or a less complex whole may be apprehended as a single thing. Whether we apprehend a tree as a single whole or as an aggregate of many things depends on a difference of mental attitude in ourselves. The separation of external reality into things is primarily subjective and is determined largely by practical interests. It may or may not have a counterpart in objective or physical reality.

To pictures as well as to external objects, there may be more or less of the attribution of thinghood. A painter tries not only to give the illusion of spatial projection but also to make the things painted look "real." The effect on the appearance of a picture of the attribution of thinghood may be well studied by means of a simple diagram which can be perceived as either one of two things.

If, for example, the opposite corners of a regular octagon

are joined by straight lines, and the eight sectors so produced are alternately inked over and left white, a figure is made which can be seen in two ways, and the mental attitudes which determine these two ways of seeing it are largely under our own control. It can be seen either as white cross on a black ground or as a black cross on a white ground. If we see it as a white cross on a black ground, it means that thinghood is being attributed to the white sectors while the black ones form the background, and vice versa. It will be found relatively difficult to see the figure in a way in which there is no attribution of thinghood, but the whole is seen as an eight-sectored plane figure.

It is found that in our perception of objects, their sensible qualities tend to persist in our experience even under conditions when we might expect them to change. If we look at a circular table from a position at which the retinal image is elliptical, we perceive not an elliptical table but a circular table seen from one side. Our visual perceptions are therefore of a typical shape of the table which is also the shape revealed by motor exploration and which therefore has some claim to be the "real" shape. Our perceiving of the table as circular is not, however, a matter of judgment or inference, but an immediate property of the perception. It is aided, of course, by the perception of opposite parts of the edge of the table as at different distances from our eyes, but this is not the whole explanation for an elliptical mark on a piece of paper tends to be seen as a circle viewed sideways more readily than as a true ellipse.

More surprisingly is this true of colours. Snow and writing paper tend to appear white, ink and soot to appear black, however they are illuminated. If coloured light falls on snow it appears (except in rare cases) not coloured but a white material illuminated by coloured light. If a shadow falls on white paper, that part of the paper looks not grey but white covered by a shadow, although if it is viewed through a tube darkened inside and is compared with a piece of grey paper, the two may be seen to be identical. Similarly, the print on a printed page looks black and the page white, however they are illuminated, although Hering has shown that in bright

sunlight the black print may be reflecting far more light than the white paper does in the evening.

There is thus a psychological foundation for the attribution to external things of persistent sensory qualities. We call an orange yellow and snow white, even although the actual sensations from those objects are only of these colours under the unusual condition of uniform illumination by white light, and although, under the conditions of an actual observation, only a small part of their surfaces may have these typical colours. We do, in fact, perceive things under the sensory qualities with which we are familiar, unless the conditions of illumination are so abnormal that the new sensory quality forces itself on our notice (as for example when we see the snow red when illuminated by a rich Alpine sunset).

In our intuition of external reality a part is played by the attribution of properties of our own experience to external things. A striking example of this is the "force" of physics, which is an explanation of the phenomena of acceleration by a conception which is not free from the anthropomorphic implications of the experience of human conation. This process has been called "the projection of the self." Such processes of projection are more widespread in primitive thinking than in our own, and the savage may attribute mental attributes to streams and stones. The ordinary civilised man's thought about external reality is not, however, free from similar projections, and it is only in the modern mathematical treatment of the physical sciences that the intrusion of the self into physical conceptions is entirely cleared away.

Innate and Acquired Factors in the Perception of External Reality.—While it is possible to devise ingenious theories of how the perception of external objects and of their spatial relationships results from experiences gained by every individual in his childhood, it must not be forgotten that there is a possibility that the dispositions to perceive things and to refer them to positions in space may (in part at least) not be acquired by the individual himself but may be inborn. Herbert Spencer believed that the individual's intuition of

things and of their spatial relationships was part of an initial mental equipment formed through the experience of his ancestors. This theory has been criticised on the ground that it assumes the hereditary transmission of acquired characters, the possibility of which is denied by nearly all modern biologists.

If we accept this criticism, however, it still remains a possibility that there is an innate basis to the individual's intuition of things and of their spatial relationships. The knowledge of external reality has its physiological basis in behaviour dispositions. The perception of an external thing is the psychological accompaniment of a behaviour reaction adapted to that thing—a reaction of avoiding it, grasping it, pushing it, and so on. Similarly, the perception of a distance is the psychological aspect of a preparedness to make a longer or shorter series of movements in order to reach that object or, if the distance in question is a height above the ground, of a preparedness or refusal to jump.

Now these behaviour dispositions which underlie judgments of externality and of distance may be innate just as are the behaviour dispositions of the instincts, and they may not have arisen as acquired dispositions but (as we supposed to be the case with instincts) as spontaneous modifications of nervous structure which have survived through the operation of natural selection because of their serviceability.

A further point which may be urged against the summary rejection of the view that these dispositions are partly innate is that we are by no means so certain as we once felt that no acquired disposition can ever become innate. It is conceded that the offspring of mice whose tails have been cut off show no tendency themselves to be born without tails, and that it is probable that all reports of acquired characters of this kind having become innate, are based on erroneous observation.

Professor McDougall has, however, recently brought forward strong evidence that some adaptations of behaviour originating in the intelligent effort of the animals first show them, may through the course of many generations result in hereditary transmission of the tendency to adopt these adapta-

tions.¹ If these conclusions are substantiated, it is quite possible that the adaptations of behaviour in response to external objects and those concerned with distance and other space relationships may in part be inherited as acquired behaviour dispositions.

The most striking evidence for the innateness of these dispositions is provided by Spalding's experiments with hooded chicks.² It was found that chicks hooded from birth and first unhooded when they were a few days old were able to avoid such obstacles as stones and showed no tendency to run into them. Also they showed behaviour correctly adapted to distance relationships. They pecked with great accuracy even at minute objects, and did not attempt to seize things beyond their reach. A more recent experimenter has shown that if such chicks are mounted on a box raised a few inches from the ground, they jump down at once; if it is a little higher they jump only with considerable hesitation, while if it is made still higher they refuse to jump down. The appropriate reactions to visually perceived things as obstacles and to visually perceived distance appeared therefore in the chicks as products of innate dispositions appearing without the co-operation of previous visual experience of any kind.

A conclusive proof that similar dispositions underlie human perceptions of external objects and their spatial relations could only be supplied by a corresponding experiment with hooded babies which is, of course, neither practicable nor desirable. Apart from the fact that the matter is not likely to be so different with chicks and with human babies as it would be if the object and space reactions of the latter were wholly acquired, the rapidity with which babies acquire perceptual adaptations indicates that human perception has an innate basis. We must remember that innate dispositions are not necessarily present at birth, that they may need for their full development the co-operation of experience, and that they may be modifiable by experience. The innate-

¹ "An Experiment for the testing of the hypothesis of Lamarck," W. McDougall, *British Journal of Psychology*, April 1927, Vol. XVII.

² "Instinct—with original observations on young animals," D. A. Spalding, *Macmillan's Magazine*, Vol. XXVII., 1873.

ness of the dispositions is not, therefore, disproved by the experimentally ascertained facts that they are certainly not perfect at birth, that a man cured of blindness late in life does not at first project his visual perceptions into a space possessing the dimension of distance, and that after a cerebral lesion has produced a squint with consequent production of double images a new system of identical points in the two eyes is later produced with consequent fusion of the retinal pictures.

It is probable that in the perception of external objects and in their spatial reference we have both innate and acquired factors. If there are inborn tendencies to fuse retinal images on disparate points as a single object at a certain distance, to correlate the space and objects of motor exploration with those of the visual field, etc., it is also clear that the individual must accumulate much experience both in the motor and visual field before the intuitions of thinghood and of space take the definite and precise form which they have in adult life.

The Embodied Self.—What is included in the consciousness of self at the perceptual level? It embraces, of course, the strictly subjective states of pleasure and pain and the various kinds of emotion; it embraces all sensuous appetites and all other forms of conation which occur at this stage of mental development; it also embraces the process of cognition, the process in which various objects in turn come to be perceived and cease to be perceived. All these items enter into the perceptual consciousness of self, though they are not discriminated from each other and separately noticed in their distinctness.

But the perceptual consciousness of self includes far more than this: it comprises the body,—the skin and what is contained within the skin. The body in some essential respects is just like other external objects. None the less, the experiences connected with it are so intimately blended with subjective process that discrimination between them would require an effort of analytic thought quite impossible on the perceptual plane. Indeed, we do not ordinarily make the distinction ourselves in a clear and consistent way. When a man says,

"I am going to London," or, "I was knocked down," evidently body and mind are included in one indiscriminate whole.

Bodily experience and subjective process blend with each other in manifold ways. The connecting link lies mainly in those sensations which are directly due to the state of the body itself independently of external impressions. Under this head are included sensations due to muscles, joints, and tendons at rest or in movement, the continuous mass of cutaneous sensations of touch and temperature which is constantly present independently of contact with external things or one part of the body with another, and finally organic sensations proper, such as hunger and thirst.

Organic sensations are on the one hand fused with sensuous appetites and pleasures and pains, and on the other they form a continuous unity with the total complex of sense-experiences through which our body is perceived. Emotions again coalesce with organic and kinaesthetic and other internally initiated sensations, *e.g.* those of hot tinglings, cold shivering, shallow or deep breathing, quickened heart beat, goose-flesh, tense or slackened muscles, and the like. We have already shown how conative consciousness blends with kinaesthetic sensation and with visible and tangible presentation of the moving limb, in the single experience of free motor activity.

The process of cognising external things is bound up with the changing spatial relation between them and the presentation of the body; in order to be perceived they must come or be brought within range of the organs of sense. To be seen a thing must either of itself enter the field of view or the open eyes must be turned toward it. For pressure and muscular tension actual contact is required, and this is presented to sight as visible contiguity. The pleasures and pains of sense, which are not merely due to internal bodily states, are similarly conditioned; in their more emphatic forms they are connected with actual contact between an external thing and the organism, followed by a perceptible change localised in the part of the sensitive surface affected, *e.g.* a bruise or a cut.

Owing to such conditions as these there is a spatial demarcation between the self and the not-self. The skin and what

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lies inside it is apprehended as belonging to the self; what lies outside it is apprehended as not-self. The distinction corresponds roughly with that between single and double contact-sensations. When we touch our own bodies there is the resulting experience including sensations due to the stimulation of both the sensitive surfaces in contact with each other. Each surface both touches and is touched. When we touch things outside the body one-half of this experience is absent.

CHAPTER X.

IDEA AND IMAGE.

Ideational Process.—The transition from perceptual process to trains of ideal representation is one of immense importance. The grand contrast between the achievements of man and the achievements of animals depends on the incomparably greater development of *ideational* process in human beings, in connection with the use of language, which is at once a consequence of this development and its most important instrument.

Ideas as compared with *percepts* possess a peculiar plasticity. Ideal representations are to begin with reproductions of percepts. But they are capable of combining with each other, and of being variously modified so as to give rise to new ideal constructions such as have never been presented in perceptual experience. A young child cannot by any adaptation of his sense-organs, or by any kind of manipulation, transform a stick into a horse ; but he can imagine the stick to be a horse, and enjoy an imaginary gallop astride of it.

But this plasticity does not merely lend itself to playful flights of fancy. It is of the highest practical importance. When ideas “ are sufficiently self-sustaining to form trains that are not wholly shaped by the circumstances of the present, entirely new possibilities of action are opened up. We can desire to live again through experiences of which there is nothing actually present to remind us, and we can desire a new experience which is as yet only imagined.” Besides this, we can plan in advance how to attain our ends, before the time arrives for putting our designs into execution. We can

compare beforehand various alternative courses, selecting and rejecting. We can ideally combine and arrange means for the fulfilment of our purposes, as they have never been combined and arranged before in perceptual experience.

By merely perceptual experiment it is possible to learn how to manipulate a stick and to strike with it, or how to cut with a sharp stone. But the device of fastening the sharp stone to the end of a stick in order to cut more effectively can only be hit on in the first instance by ideal combination. Though the stick has been used to strike with, it has never before been used as an instrument for cutting; and it cannot be so used without bringing it into combinations which would never occur, if the subject waited for what perceptual experiences might happen to present, instead of ideally anticipating and predetermining the future.

Besides this practical function, ideal construction is also manifested in the interpretation of perceptual data which links them together as parts of a unified system. We leave a fire burning, and on our return find it burning no longer, and we accordingly represent it as having gone out or been put out in the interval. Such ideal interweaving of perceptual data yields the presentation of a connected world.

Idea and Image.—The phrase “train of ideas” implies a serial process in which certain distinct constituents of the train, called ideas, follow one another in time. What is the nature of each of these distinct constituents or separate ideas? An idea may be defined as a significant mental image. It thus has two components, the image and its meaning. An image is a presentation which is recognisably like, but really is not, an actual sense-experience. The elements of which it is comprised are like in quality to actual sensations, and their spatial and temporal grouping resembles the grouping of the sensational content of sense-perception. When I mentally picture an orange, though there is no orange present to my senses, I see with my mind’s eye a colour and shape more or less resembling those of an orange actually seen with the bodily eye. The colour and shape are said to be “imaged.” Similarly, to image a sound is to hear the sound with the

“mind’s ear.” To image an odour is to smell it with the “mind’s nose.”

To image something is not simply equivalent to thinking of it. I can think of the colour yellow without seeing it with my mind’s eye. I can think of it by means of the word “yellow,” or by representing its position in the spectrum, or in similar ways. There are persons who are simply incapable of forming images of colour at all, and yet they can think and talk about colours intelligently.

This is possible because the image is only one constituent of the idea. The other is the meaning which the image conveys, and this depends on its efficacy in setting a certain group of associated dispositions in a state of nascent or implicit excitation.

The value of image for ideal representation depends on its associations ; and it is therefore in a great measure independent of its accuracy as a copy of any sense-experience of the object which we ideally represent. Words mentally heard, or articulated, or both, form a most important class of images. But they do not resemble any sensible appearance of the object which we represent by means of them. Their value lies in their representative function, and this depends on the implicit revivals which accompany them as a sort of mental “fringe” or “halo” (James). So when we do use images which copy the sensible presentation of the object of thought to the eye, or other senses, it is by no means necessary that the reproduction should be accurate. As a matter of fact, the same image is intrinsically capable of representing very diverse things.

I think of St. Paul’s and there floats before my mental view a vague picture of something cup-shaped. If this mental picture could be transformed into an external object so that everybody could look at it, it might not suggest St. Paul’s to anybody ; it might just as well suggest a variety of other things. Had the general direction of my thoughts been different, I might have used the same image for representing a mosque in Constantinople, or even for representing Constantinople itself. In varying circumstances and varying contexts the same image might have excited different groups of associated dispositions.

Image and Impression.—By “impression” I mean the sensational content of actual perception. We have now to inquire what characters distinguish impressions as such, from images as such, so as to prevent us from confusing them save in very exceptional cases. We may enumerate the following marks as distinctive of the image :—

(1) Its fragmentariness ; (2) its independence of our movements ; (3) its peculiar mode of behaviour as regards persistence and change ; (4) its indistinctness ; (5) its lack of intensity.

(1) The image as compared with the impression is *fragmentary*. The impression is continuous with the totality of sense-experience at the moment at which it occurs. The stimulus which affects the organ of hearing also produces tactile sensations in the way of vibration ; and these are continuous with the totality of cutaneous sensations. At the same time it modifies organic sensibility more or less, according to its intensity or suddenness. Similarly, visual sensations are intimately combined with tactile and motor sensations of the eye, so meditately with the touch-experiences of the whole body.

Tactual sensations in general are blended with those due to position and movement of the limbs. All sensations of the special senses are more or less fused with the massive sentience due to the state of the external organs of the body. Thus there is at any moment a general context of sense-experience, which includes, in its continuous unity, any particular impression or group of impressions. But the image has no place in this continuous complex. Its place in that context is preoccupied by sensations due to the actual operation of external stimuli. When I mentally picture the Duke of Wellington, it is not my mental picture, but the sensations due to the stimulation of my retina at the moment, which enter into the total context of sense-experience at the moment. And this image has no corresponding context of its own. It occurs in relative isolation and detachment.

(2) Impressions vary with *bodily movement* ; for instance when we shut our eyes, the field of view disappears. Images on the contrary do *not* show this dependence on movement ;

since they are not conditioned by an external stimulus, the varying position of the sense-organs, relatively to external things, can make no difference to them.

(3) Impressions due to the operation of a persistent stimulus display a peculiar steadiness which is *not* found in images. The image fluctuates with the fluctuations in our attention, disappearing when we cease to be interested in maintaining it. And even when we do our best to retain it unaltered, our success is generally imperfect. Visual imagery in particular, except in the case of exceptional visualisers, "flows and flickers," as Dr. Ward says, like the gas-jets at a fête. These changes are of a very distinctive kind, and may suffice to mark off an image from an impression, when other tests fail.

Beside the peculiar steadiness due to uniform persistence of the stimulus, the impression also shows a peculiar abruptness of transition as the stimulus varies, or begins or ceases to operate. Setting aside the "flow and flicker" to which we have just referred, transitions in the trains of ideas, being conditioned by subjective interest and preformed association, bear the character of a gradual development; on the other hand, impressional transitions, being due to change of stimulation, bear the character of something which "happens" to the mind from without rather than of a development from within.

(4) Images as compared with impressions are for the most part *blurred and indefinite*. They lack the wealth of determinate detail which belongs to perceptual experience. In particular the finer differences appreciable in actual perception commonly fail to be reproduced in the image.

In this respect, however, there are great differences between individuals, and in the same individual for different kinds of mental imagery. Some people can "visualise" absent or imaginary scenes with a detailed distinctness of form and colour approaching that of actual vision. Others distinctly reproduce forms in black and white, but have little power of recalling colour. Here and there we find a person who cannot visualise at all. Again, the indistinct visualiser may be able to image articulate sounds with clear-cut precision. Yet the same person may be able to revive inarticulate noise only in a very vague and indefinite way.

The imagery used in ordinary thinking is probably much less distinct than the imagery people are capable of commanding when they make an express effort.

(5) As regards *intensity*, it seems clear that we can reproduce differences of loudness and brightness in much the same way as we reproduce differences of pitch and colour. But in general mental imagery is in this respect much more limited in range and much less finely differentiated than sense-perception. There are degrees of loudness and brightness too high to be revived at all; and even within the range of possible revival, which for the most part is very narrow, the finer gradations of intensive difference are not reproduced.

But these deficiencies do not seem to account for the unique importance which is generally ascribed to the superior intensity, vivacity, force, or liveliness of the impression. The real reason of this seems to lie in the fact that other distinctive features of the impression are conspicuous in proportion to its intensity, and virtually vanish when its intensity is very slight. Thus the persistent steadiness of impressions when the stimulus persists unaltered is scarcely appreciable when the impression is so faint as to be barely discernible. Similarly, continuity with the general content of sense-experience fails to be an unambiguous mark of the impression, when this is so feeble that it can only be doubtfully and intermittently distinguished amid the mass of other sensations.

Types of Mental Imagery.—Individuals differ greatly in the kind of mental imagery which is predominant in their trains of ideas. Some are mainly visualisers, others mainly auditory; in others reproductions of motor process and tactual experiences or both have a decisive preponderance. Images of smells and tastes do not appear ever to take the lead; but there are persons who have a quite exceptional gift for reproducing them. This does not mean that every individual falls very definitely into one or other of these groups. Probably most of us belong to a mixed type in which one kind of imagery is more or less predominant, but others are freely used on occasion.

Motor imagery, by which I mean mental revival of muscle,

joint, and tendon sensations accompanying movement or muscular tension, occupies a peculiar place. It commonly occurs along with other revivals, and is more or less blended with them, so that its separate presence may sometimes be difficult to ascertain. In recalling the sounds of words, there is commonly a tendency, distinctly or obscurely marked, to articulate them mentally. In visualising the shape, size, relative position, and motion of objects, there is more or less revival of the experiences of ocular movement constantly present in actual vision. So in recalling smells there is a tendency to reproduce the action of sniffing. The relative prominence of the motor element in these cases may vary greatly. Sometimes it is very prominent. Sometimes it is hardly distinguishable. Where its presence is conspicuous, we speak of motor-auditive, motor-visual, or motor-olfactory imagery.

In the mental life of most of us some form of verbal imagery plays a leading part. In some of us such images are almost exclusively used. Hence in distinguishing individual types, I shall lay main stress on the different ways in which different persons reproduce words.

I myself belong to a well-marked type. Though my general power of visualising both shape and colour is fairly good, I make relatively little use of it in my ordinary thinking. I depend mainly on verbal images, and these are invariably of the motor-auditive type. In reproducing words I at once hear them mentally and mentally articulate them. My power of reviving sounds which I cannot produce myself is small. I tend to reproduce some imperfect imitation of my own instead of copying the actual noises. Thus in attempting to recall the noise of a dog barking, I mentally say and hear the sound "bow-wow." I know that this is not much like the actual bark, but it is the nearest approach to it I can make.

In my own recall of words the motor and the auditory elements are about equally prominent. I now pass to two cases in which this balance is lost. In the one the motor side is altogether predominant, and in the other the auditory.

Some years ago a distinguished Austrian professor of

anatomy, named Stricker, published an interesting monograph on speech-images. He there described his own verbal imagery, and undoubtingly assumed that all men were like himself. According to this account words are reproduced merely as suppressed whispers, sometimes accompanied by an incipient twitter of the organs of speech. These suppressed whispers are mentally inaudible. They are mentally articulated, but not heard at all. Stricker states that if he kept his mouth open he could not reproduce labials, and that in general his power of mental reproduction was abolished if his vocal organs were kept in such a position that they could not pronounce the corresponding sounds.

About the same time a French writer, Victor Egger, published a book entitled *The Internal Word*. In this work he maintained that words are usually reproduced merely as auditory images, and that the presence of a motor element is only an occasional accompaniment.

Victor Egger's case is much less exceptional than Stricker's. Probably neither of them described their experiences with strict accuracy. The motor and the auditory components of a word are intimately fused both in actual speaking and in mental reproduction. Hence if one of them is relatively faint it is likely to escape notice altogether.

In another somewhat uncommon group of cases a person reproduces words predominantly in the form of printed or written characters. In extreme instances a man visualises in this way the words which he actually speaks or hears. A person belonging to this type will recall a passage in a book by picturing the printed page, and will be able to state whereabouts on the page a word or sentence occurs. He may even be able to read off the words mentally in different orders,—backward, for instance, as well as forward. In delivering without notes a speech which he has previously written, he will see the pages of his own manuscript, and even be disturbed by the occurrence of blots and erasures.

The co-operating play-writers, Scribe and Legouvé, furnish a good example of the contrast between the visual and the auditive types. Legouvé said to Scribe, "When I write a scene, I hear and you see. At each phrase which I write the

voice of the person speaking strikes my ear. The diverse intonations of the actors sound under my pen as the words appear on my paper. As for you, who are the theatre itself, your actors walk, they bestir themselves under your eyes. I am auditor, you are spectator." "You are perfectly right," said Scribe. "Do you know where I am when I write? In the middle of the stalls."

Actual odours have often an exceptional power of reproducing other presentations. But few people can mentally recall them save in a very limited and fitful way. There are, however, exceptions. The most striking on record is perhaps that of Zola the novelist, whose mental imagery has been submitted to a searching and complete examination by Dr. Toulouse. Zola recalled odours with great ease and distinctness—better, it is said, than colours or any other past sensations. For him, almost every object had its distinctive smell: this was true of certain towns, such as Marseilles or Paris, and even of certain streets and of the different seasons of the year. The autumn, for instance, smelled of mushrooms and decaying leaves. In mental reproduction all these distinctive smells were revived vividly and distinctly. Zola was a pronounced olfactory.

A special command of certain kinds of imagery does not seem in general to be connected with any special fineness or vividness in the corresponding sensations. And inversely, the sensations may be vivid and finely discriminating, without a corresponding power of reproducing them. I know persons who appear to have virtually no power of mentally visualising at all. Yet they see well. A man may be able to discriminate and identify colours when he sees them, and yet have no power of mentally picturing them when he does not see. The conditions which make actual perception possible are not sufficient to make corresponding imagery possible.

CHAPTER XI.

CONDITIONS OF IDEAL REVIVAL.

We have treated in Chapter VII. of retentiveness, association, and reproduction. We now take up the same topic again in special connection with trains of ideas.

There are two aspects both of perceptual and of ideational process—the productive and the reproductive. In perceptual process, motor activity in part follows the tracks traced for it by previous experience; in part it strikes out relatively new lines of development in the way of fresh adjustment to the exigencies of the present situation. Similarly, trains of ideas are based on revival of past ideas and percepts, but they also involve a reshaping, reconstruction, and further development of the material furnished by past experience in conformity with present conditions and interests. The next chapter will treat of the productive side of ideational process. For the present, we shall confine ourselves to the conditions of ideal reproduction as such.

Spontaneous Revival.—The order of ideal revival is of course determined by preformed associations. But association is by no means the one essential condition. Ideas also emerge into consciousness of themselves, without being introduced by other associated ideas or percepts. Recent, intense, or persistent occupation with any topic generates a tendency to revert to it independently of any prompting cue. Rhythmic sequences are peculiarly apt to reproduce themselves in this way, as is exemplified in Mark Twain's humorous description of the importunate recurrence of the lines, "Punch, punch, punch with care, Punch in the presence of the passenger."

In certain recent experiments on memory, series of nonsense syllables were repeatedly read over, and the power of recalling them subsequently tested after an interval of about five

minutes. Some of the subjects could not prevent the syllables from rising spontaneously into consciousness during the interval, even though they attempted to divert their attention into other channels. It has also been shown experimentally that the persistent pursuit of a mechanical occupation requiring only slight attention is peculiarly favourable to the free emergence of disconnected trains of ideas relating to interesting topics.

In general, the stronger our propensity is to go on with a train of thought at the time when it is discontinued owing to interruption or fatigue, the stronger is the tendency to revert to it again, provided that our attention has not been diverted from it for too long a time or by other pursuits of too absorbing a nature. An unsolved puzzle such as a chess problem may take so strong a hold on our minds that it persists in haunting us at intervals in spite of our best efforts to exclude it in favour of more important matters. In the acute stages of the war in South Africa, the thoughts of most people spontaneously turned to this topic, whenever they were not otherwise preoccupied, without needing any prompting cue in the way of association.

It is spontaneous revival which so often murders sleep. We do our best to divert our minds from some topic which keeps us awake by the importunate persistency of its recurrence. We may succeed for a time, and so drop into a doze. But presently we find ourselves awake again, and again following up the old train of thought with painful intensity.

The commonest instances, so common that they are likely to escape notice from their very triviality, are those in which we resume an occupation or train of thought after a relatively slight and transient interruption. I may, for example, be engaged in thinking out some psychological difficulty when I am called on to read a letter, to say what I will have for dinner, to give directions to a servant, to make up my fire or to put a fresh pen in my penholder. The interruption really diverts my attention for the time being ; but as soon as the distraction is over, I return as a matter of course to the previous train of ideas, just as a stream returns to its old channel when a barrier which had obstructed it is removed.

Association and Spontaneous Revival.—The conditions which determine spontaneous revival are operative also when the sequence of ideas is determined by association. The course of ideal reproduction ordinarily depends on the conjoint operation of both factors. The ideas which are most apt to recur spontaneously are also most apt to be suggested by association. Revival partly depends on the preformed associations, partly on the intrinsic excitability of the disposition it tends to bring into action. But the same kind of conditions which favour spontaneous reproduction also render mental dispositions in general more excitable and so facilitate the working of association in certain directions rather than in others.

When *A* tends to recall by association either *B* or *C* or *D*, it will by preference reinstate the experience which has most interest for the subject or one which has recently and strongly engaged his attention. If a man's prevailing interest lies temporarily or permanently in the direction of Psychology or Arctic exploration, or bicycling, or nonsense rhymes, whatever he sees or hears or thinks is likely by preference to suggest something connected with these rather than with other subjects. If I hear the name "Smith," it will, *ceteris paribus*, call up to mind the particular Smith who has of late taken up much of my attention in preference to the many other Smiths with whom I am well acquainted. The word "Australian" is likely to suggest to the cricketer a coming test-match; to the politician, the relations between the colonies and the mother-country.

In general we may compare the course of associative revival to the spreading of a fire in a mass of fuel which is inflammable in very variable degrees in its different parts. The spreading flame corresponds to the reproductive power of preformed associations; the varying inflammability of the fuel corresponds to the varying excitability of mental dispositions.

"Association by Contiguity."—In Chapter VII. we discussed those associations which are formed in the course of the same continuous attention-process—a process concerned throughout with the same total object so as to focus its

successive features and aspects in successive order. We then saw that the degree of unity of the total object is a most important factor in determining the strength of the resulting associations. We also noted the part played by contiguity as a co-operative condition. The items which emerge successively into the focus of attention are, *ceteris paribus*, more intimately and firmly associated the nearer they are to each other in the temporal sequence. The association is, *ceteris paribus*, strongest when the items associated have been presented simultaneously or in immediate succession.

We have now to inquire whether bare proximity in time, apart from anything which can be called continuity of interest or attention, is sufficient of itself to generate associations. According to the traditional "law of contiguity," as stated, for example, by James and John Mill and Professor Bain, experiences form associations by the mere fact of their occurring simultaneously or in immediate succession. It would be going too far to deny the possibility of this. But it seems difficult to discover instances in which bare proximity is clearly the sole operative condition. In general there is also present some form and degree of continuity of interest. In Chapter VII. we considered only attention-processes concerned throughout with the same total object. But when attention is being transferred from one total object to another there is a certain continuity at the moment of transition. For the moment the mind is not occupied with either topic exclusively, it is occupied with the passage from the one to the other. Just in so far as the new process is experienced as an interruption of the prior one, it is a constituent part of it, an incident in its progress.

This kind of continuity gives rise to many associations. I may be playing chess when some one brings me a telegram containing important news. When in the future I think of the telegram, it is likely to remind me of the game and vice versa. The likelihood is the greater the more vividly the interruption was felt as such.

We must also note that the distinction between the total object of one attention-process and that of another by no means implies complete disconnection. They may have more or less community of nature or interest. A man in reading

his newspaper may attend successively to the Boer war,¹ to the Japanese treaty, to reform of procedure in the House of Commons, to the cricket in Australia, to the horse racing, to the University news, to a trial for murder, and so on. These various topics have so much in common that they all belong to the news of the day. The interest in each of them is a branch of the general interest in knowing what men are saying and doing. The topics again fall into distinct groups, each unified by a certain special community of nature and interest ; there is the political group, the sporting group, etc.

To take another illustration, there is a certain thread of continuity permeating the various occupations of an ordinary day. They are connected as forming part of the general scheme of the day's business. And this continuity, together with the fact that they are successively attended to, is sufficient to give rise to associative connection. The total experience of the day seems to leave a total disposition behind capable of being re-excited as a whole in the way of implicit revival. If some one asks me, " Did you carry an umbrella yesterday ? " I may answer immediately and decisively, " No." I do not need to recall the successive details of my yesterday's doings in order to discover whether walking with an umbrella was one of them. And my attitude is not at all like that of a mere failure to remember. I positively remember *not* doing what is suggested. I feel it at once to be incongruous with my total impression of yesterday's experiences—due to the re-excitement of the total or cumulative disposition which yesterday's experiences have united to produce. It is with this total impression of yesterday as a whole that I start in recalling its incidents one by one. The detailed recall is the filling in of a general scheme ; it is translation from implicit into explicit revival.

Understanding " continuity of interest " in this wide sense, it may well be doubted whether any associations are formed without it. It would seem that the only cases in which bare proximity could operate as the sole condition would be these associations between presentations which escape attention altogether or between these and a presentation which is

¹ This was written in the early months of 1901.

attended to. But it is hard to find unambiguous instances of this, and in any case the associations so formed must play a very subordinate part in our mental life.

Emotion as determining Ideal Revival.—The phrase “train of ideas” suggests a serial sequence in which each successive item calls up the next. But we must always bear in mind that in a continuous attention-process each successive presentation is apprehended in relation to the total object, and that the nature of this object is a most important factor in determining the flow of ideas. The general direction of mental activity tends to exclude the revival of irrelevant ideas, just as it tends to ignore or dismiss them when they do emerge. When our dominant interest is in mythology, the thought of the rainbow will be likely to suggest Iris, the messenger of the gods. When our dominant interest is in Physics, the thought of the rainbow will be likely to suggest the laws of the refraction of light. The word “match-making” will call up different ideas according as it is used in a conversation on mothers and daughters, or on British industries.

Each of the various typical forms of emotion or emotional mood involves a certain general direction of interest. Each is concerned with a certain kind of object; fear with danger, anger with insults and injuries, grief with loss and defeat, joy with success and gratification, jealously with the encroachments of others on what we regard as our own peculiar possessions. Hence these emotional states severally favour the revival of certain groups or classes of ideas. In a fit of depression a man finds his mind filled with gloomy anticipations and memories in whatever special direction his thoughts may turn. An angry or ill-tempered mood seeks and finds its own appropriate food by directing the flow of ideal revival into certain channels; everything suggests to it representations of intended or real injury, neglect, or persecution, and thoughts of resistance or reprisal.

Similarly, strong and persistent fear calls up ideas of danger and insecurity. In mental depression we see only the dark side of things. Fresh air and exercise, by bringing back a cheerful disposition, may give a quite new direction to our

thoughts, so that we now see evidence of success and progress where we had previously seen defeat and failure. The emotion of itself tends to call up the kind of ideas which are congruent with it, and afford it the appropriate field for its own development. And when these ideas arise, they become associated with each other. Hence an emotional mood may become the centre and rallying point of a fixed circle of ideas which recur whenever it recurs. Those who are subject to recurrent fits of depression find themselves reverting, on each return of their mental gloom, to the same monotonous cycle of distressing topics. They are persistently haunted by these, and escape from them only when something occurs to change their general emotional state. This may occur through the advent of some striking piece of good fortune, or the like ; but at least as often it depends on a change in their general bodily condition.

Reproduction by Similars.—A certain appearance of the sky may suggest to me coming rain. It does so because in the past I have noticed rain to follow when the sky looked more or less like this. The revival depends on likeness ; but the likeness need not be complete. Indeed, it is in the last degree improbable that it should be complete. All that is required is more or less similarity between the present aspect of the sky and other appearances which have been followed by rain in the past.

This example is typical. In general when two presentations *A* and *B* have united in past experience so as to form an association, what is required for the ideal revival of *B* is not an exact repetition of *A* but only its partial repetition. Any one of a series of presentations *A*₁, *A*₂, *A*₃, etc., having more or less community of nature with *A*, will tend to recall *B*.

A young child has learned to use the word "moo-cow" when he sees a cow. He notices a small article on the dinner table and calls it also a moo-cow. It is in all respects unlike the animal in field or farmyard, except in having ivory tips which are not altogether unlike horns. The same child has seen a band playing wind instruments. Shortly afterward he puts a croquet mallet to his mouth and makes a noise in imitation of music. The printed or written letters *abc* tend

to call up *def* through association, and this tendency operates in spite of variation in their size and colour and within limits in spite of variations in their shape.

What is it that really takes place in such cases? *A* has formed an association with *B*, and in consequence a more or less similar *A*₁ tends to revive *B*.¹ It is sometimes said that what really happens is that *A*₁ first recalls *A*, and that *A* then reinstates *B*. But this account of the process is clearly contrary to the facts of actual experience. When the present appearance of the sky suggests to me impending rain, it is by no means necessary that it should first set me thinking of some other similar appearance which has been followed by rain on a previous occasion. In order that the letters *ABC* may recall *DEF* it is by no means necessary that my mind should first revert to a past instance in which *DEF* followed *ABC*.

The true explanation is that so far as concerns the psychology of retentiveness and reproduction, similarity is reducible to partial identity. So far as *A*₁ resembles *A*, its occurrence is a partial recurrence of *A*. Its occurrence involves a partial re-excitement of the mental trace or disposition left behind by *A*, with a consequent tendency to re-excite the associated disposition left behind by *B*. Only those features of the present appearance of the sky which are common to it and to past appearances followed by rain, now suggest rain to my mind. The features which distinctively belong to my present experience do not operate at all in producing the ideal revival, though they may modify it in various ways, as we shall see in the next chapter.

Reproduction of Similars.—Besides suggesting rain, or instead of suggesting rain, the present appearance of the sky may suggest a similar appearance seen by me a week or a year ago. *A*₁ may recall *A* itself instead of recalling a *B* which has been associated with *A*.

Some psychologists would call the revival of *A* by *A*₁ a

¹ The difference between *A* and *A*₁ in many cases leads to a modification of *B*—to the revival of a *B*₁. But this belongs to the productive side of mental process, to be dealt with in Chapter XII.

case of reproduction of similarity, whereas according to them the revival of *B* by A_1 is a revival not by similarity but by contiguity. This language is misleading. So far as similarity operates at all, it operates equally in both processes. In both processes it is not A_1 as a total presentation which recalls *A* or *B*, but only those features of A_1 which are common to it and to *A*. So far as A_1 differs from *A*, it does not tend to revive either *A* or *B*. If we symbolise by *C* that which is common to *A* and A_1 , it is *C* which in both cases is the operative factor in producing the revival. The differentiating features of *A* we may symbolise by *D* and those of A_1 by D_1 . Neither *D* nor D_1 are operative in bringing about the reproduction either of *A* or *B*.

[¹ The same fundamental principle of association is involved in both processes. *C* and *B* have in past experience entered into the same continuous attention-process : hence *C* tends to recall *B*. But *C* also tends to recall *D* for the same reason. *C* and *D* have also entered into the same continuous attention-process in past experience. We must remember that what *C* recalls is not, properly speaking, the total presentation of *A*, but only that part of it which is not already given. *C* cannot recall itself but only *D*.]

Yet there is a most vital difference between the two kinds of revival. The difference is not in the operative factor bringing about recall ; for in both cases this is *C*. Nor does it lie in the principle of association, for in both cases this is continuity of interest or attention. The difference is rather in the *results* of the two processes and it depends on the peculiar nature in each case of what is reproduced.

B is a total presentation, just as A_1 is a total presentation, and when it is recalled it connects itself as a whole with A_1 so as to form an individual link in the same serial succession of ideas,—in the same continuous attention-process. The coming storm is thought of as a concrete event following the present total appearance of the sky, just as in my past experiences other storms have followed on similar appearances of the sky. But when *C* recalls *D*, this is not possible. *D*

¹ If the beginner finds the passage in brackets too difficult, he may omit it on a first reading.

instead of uniting itself with the total presentation A_1 as a successive link in the same train of ideas, unites itself immediately with C so as to reconstitute the total presentation A . But in this process D must displace D_1 and be substituted for it. For D and D_1 are incompatible. They cannot both be apprehended in the same relation to C as features of the same total presentation. Hence C is twice presented, once as part of the total presentation A_1 , and again as part of the total presentation A .]

When the present appearance of the sky suggests a past appearance more or less similar, the features common to both are duplicated in consciousness. They are presented in two distinct instances or examples. This would still be the case, even if the present appearance exactly resembled the past. For the attendant circumstances would differ so as to be incapable of union in the same relation to the identical appearance as to constitute the same total presentation.

The revival of B by A_1 may be called serial revival because B is recalled as a successive link in the same mental train to which A_1 belongs. The revival of A by A_1 is an instance of what we may call the revival of similars by similars, or simply the revival of similars. Properly speaking, what is recalled in this process is not A but only those features of A or connected with it which distinguish it from A .

It is to be clearly understood that the revival of similars by similars does not at all depend on the similarity having been previously noticed. So far as the revival depends on previous attention to the similarity, it is a serial revival. If on some occasion I have met two men and noticed that they resemble each other, an association is thereby established between the total presentations of each. When in the future I meet one of them separately, my attention will tend to turn to the other because it has already dwelt on both of them simultaneously or successively when I met them together. But if an entirely new acquaintance reminds me of an old friend because they are like each other, this is a pure case of the revival of similars. The revival of similars is of immense importance in our mental life because it supplies materials for ideal construction, which could not be obtained in any other way. Its value in

this respect is connected with its being the most important form of divergent or digressive revival.

Divergent Revival.—More or less similar presentations may be attended to in the course of mental trains otherwise disconnected, so that the corresponding dispositions acquire a variety of divergent associations. Thus each successive link in a train of ideas may have a multitude of cross-associations capable of leading to the revival of ideas belonging to other trains. Hence, in pursuing any line of thought, digressions are apt to occur; ideas are apt to be recalled belonging to more or less disconnected lines of thought. While I am thinking of the rainbow as illustrating the laws of optics, Wordsworth's line, "I need not proud Philosophy to tell me what thou art," may intrude itself into my scientific train of ideas.

Divergent reproduction may also occur in perpetual process. The child may be in the habit of both shaking his rattle and of putting it in his mouth to suck, and he may turn suddenly from the one occupation to the other. But such digressions play a very much more important part in ideational process. Ideal digression is always possible because the flow of ideas is independent of the actual environment present to the sense. If in thinking of a friend's affairs, I recall the idea of a book which I have lent him, and if this book happens to be Nansen's *Farthest North*, my thoughts may fly off to the Arctic regions, leaving my friend altogether. But on the perceptual plane I could not begin to occupy myself with the North Pole unless it happened to be accessible to my senses.

When divergent revival occurs, we may either leave the old train of ideas for a new one, as in this example, or we may proceed with the old. In proceeding with the old we may either disregard the ideas awakened by the collateral association or we may utilise them by incorporating them with requisite modifications in our ideal construction. Similarly, when we leave the previous train for a new one, we may in so doing retain and utilise materials derived from the old. A passage from Walter Scott's *Journal* may illustrate the incorporation of a collateral suggestion in the previous train

of ideas. After his financial ruin, his mind dwelt persistently on the necessity of earning money by his literary labours in order to pay his debts. The question whether his writings will continue to win the favour of the public gives him especial concern, and he repeatedly recurs to it in his diary.

The following is a characteristic passage : " Talking of writers, I finished my six pages, neat and handsome, yesterday. N.B. All night I fell asleep, and the oil dropped from the lamp upon my manuscript. Will this extreme unction make it go smoothly down with the public ? " Here the writer's main line of thought related to the progress of his work and his prospects of success with the public. The dropping of the oil on his manuscript was a collateral suggestion. But he connects it in a playful way with his dominant interest, and so incorporates it with the previous train of ideas. Perhaps the oil will make his work go smoothly down with the public.

My own use of this illustration exemplifies the reverse case of material derived from a previous train of thought being retained and utilised in another which displaces it by a divergent revival. After writing part of the present chapter I began to read Scott's *Journal*, and came upon the passage quoted. The oddity of the mental transition from the dropping of oil on a manuscript to success with the public diverted my attention to psychological topics, and in particular to what I had just been writing about. I then noticed that the passage in Scott furnishes a fairly simple example of the way in which a train of ideas may be modified and developed by incorporating digressive revivals.

The examples of divergent reproduction, to which I have referred, are examples of serial reproduction, and not of the revival of similars. The thought of my friend revives the idea of the book called *Farthest North*, and of Arctic explorations, simply because I have lent this book to him. The book does not resemble him, or anything connected with him. But by far the most numerous and important cases of digressive revival are cases of the revival of similars by similars. Such revival is essentially digressive except when the main interest of thought explicitly consists in finding a group or series of similar things, as in classifying or searching for precedents.

In general, the most copious and the most important materials for ideal construction are supplied by the revival of similars. It is the most common means of bringing before the mind in one view objects which have been previously presented in disconnected contexts remote from each other in space or time or both. Thus it is, as Bain remarks, the main foe of routine, and those minds in which it is a frequent mode of transition are more apt than others to form strikingly fresh ideal combinations. In particular, it is the most abundant source of materials for the process of comparison whereby the features common to similar objects and situations are consciously distinguished from those in which they differ. Thus it forms a line of demarcation between mind in the lower animals and mind in man. For, as James points out, there is little or no evidence in the case of animals for the reproduction of similars followed by comparison.

Of the way in which divergent revivals of this kind may be incorporated with the main train of thought, something will be said in the next chapter. Here it will be sufficient to refer to the simplest case, that in which the similarity simply *illustrates*, by making some feature of the current train of ideas more vivid and distinct.

This is exemplified by all simile, metaphor, and parable. Scott describes a state of depression into which he fell after the death of his wife. "A kind of cloud of stupidity hangs about me, as if all were unreal that men seem to be doing and talking about."¹ A later entry in the journal is as follows : "I have had sound sleep to-night, and waked with little or nothing of the strange dreamy feeling which made me for some days feel like one bewildered in a country where mist or snow has disguised those features of the landscape which are best known to him." Here his own mental condition suggests the similar feelings of one who finds the features of a familiar scene masked and transformed by mist or snow, and the suggestion is utilised to give emphasis and distinctness to the points of agreement which give rise to the digressive revival.

¹*Journal*, Vol. V., p. 194.

CHAPTER XII.

PRODUCTIVE ASPECT OF IDEATIONAL PROCESS.

Production and Reproduction.—The productive aspect of mental process presupposes the reproductive and is unintelligible apart from it. But the two aspects are never identical; and association is sufficient to account only for one of them. It accounts for the recurrence of previously experienced combinations, but not for the making of new. Hence such a phrase as “constructive association” which Bain uses is, strictly speaking, meaningless. It is wrong to say as he does that “by means of association” the mind has the power “to form combinations or aggregates, different from anything actually experienced.” Association accounts for reinstatement. But it does not account for the new combination into which the reproduced presentation enters either in the process of reproduction or after it. It does not account for the fact that the reproduced presentation modifies and is modified by the new context in which it becomes incorporated.

The movements of a lion suggest to me those of a cat, and I compare them. If I have already noted their likeness and difference in the past, the process may be mainly one of reproduction. But if the comparison takes place for the first time, it is a new production which association does not adequately explain. Association explains why at the present moment the idea of a cat occurs to me. But it does not of itself account for the presentation of the resemblance and difference

between a cat and a lion. This presentation cannot be reproduced, for it has not occurred in my experience before. The resemblances and differences are observed for the first time. The thought of these resemblances and differences becomes associated in the process of attending to them with the idea of a cat and with that of a lion. But this association is a result, not a cause, of the new experience.

Take another illustration. I am acquainted with houses and I am acquainted with things made of gold. But I have never hitherto thought of a house consisting of this material. I happen, however, to be looking at the house of a man who is exceedingly rich and very ostentatious of his wealth. I remark, "Brick and stone are hardly suitable for Smith's house; it ought to be made of gold."

Here the thought of Smith suggests that of gold by association. But it is not association which makes me think of the gold in relation to the house. This is due to my being already interested in the house at the time when the idea of gold emerges. Still less does association account for the peculiar way in which the gold becomes related to the house in my thought. I have had experience of gold in the shape of ingots, or of coins used as money, or watch chains, rings, and the like, used for ornament. But I have never had experience of gold in the shape of a house and used for living and sleeping in. The idea of the gold as thus shaped and thus used cannot therefore be reproduced by association. It is a new mental product. It arises because I am interested in the material of the building before me in a particular manner. I am interested in finding some material other than the actual brick or stone which shall be more in keeping with the general impression Smith and his belongings have made upon me. When gold suggests itself to my mind I utilise and transform the idea so as to complete the thought which is in process of formation. The idea of the gold makes my thought determinate where it was previously indeterminate. But in fulfilling this function, in entering into this new relation, the idea of the gold receives new determinations which are not and cannot be reproduced from previous experience.

Forms of Combination.—Psychologists have not studied the forms and conditions of mental production as they have those of reproduction. They commonly content themselves with speaking vaguely of processes of combining and separating, and they insist that the materials combined and separated must be given in past experience. Thus Locke tells us that the “dominion of man, in this little world of his own understanding, is much the same as it is in the great world of visible things.” He can only “compound and divide the materials that are made to his hand.”

Against this view it must be urged in the first place, that it wrongly identifies all productive process with constructive process. But such operations as comparison and abstraction, in their pure form, do not involve construction in the strict sense. We construct when we imagine gold substituted for stone in the house we are looking at. But we do not construct in comparing a lion and a cat. There is merely an alternate focussing of attention now on the one and now on the other, so as to bring out their differences and resemblances.

And in the second place, the contrast between the materials combined and the process of combining is very apt to mislead. It tends to conceal the fact that *forms of combination* are themselves part of the objective content of consciousness, and that in every constructive process we start with such a form derived from past experiences. Thus in our example, the way in which bricks, stones, etc., are put together is as much part of the presented object we call a house as are the bricks and stones themselves. In imagining the house to be built of gold we retain this general plan of combination and only alter one of the items which enter into it.

Comparison and Abstraction.—As we have indicated, there are two kinds of productive process. The first consists merely in a certain play of attention, such as is involved in Comparison. In the second, a relatively new object is constructed out of given materials in accordance with a given plan of combination or relational scheme.

In *Comparing*, the total object of attention includes the two things compared. Each is focussed in turn, and there

is an endeavour to keep the one still in view in the very act of concentrating attention on the other, so as mentally to superpose them. The result is that relations of resemblance and difference emerge, and the points of agreement are more and more definitely distinguished from the points of disagreement.

This distinction of common features from divergent features is called abstraction, when the divergence consists in the specific variation of a certain generic nature. Right-angled and obtuse-angled triangles agree in being triangular. But they are so in different ways. To distinguish between the common character of being triangular and its specific variations in different triangles is to abstract. Abstractions arise in connection with the process of comparison and also, as we shall see later, with the use of language.

Comparison is essentially a productive process. For the generic nature as such is not apprehended at all until it is distinguished from the specific determination in which it is so to speak embedded. To cognise triangles is one thing ; to cognise the fact of their being triangular is quite another. This is not presented to consciousness until the common character of various kinds of triangles is distinguished from their specific differences.

Similarly, it is possible to be aware of a group of three stones, or of three knocks at a door, without being aware of the number three. In order to be aware of the number three, it is necessary to distinguish the character of threeness, common to three stones, three knocks at a door, or three terms in a syllogism from the specific differences.

It may be said that we are implicitly aware of the abstract feature before the abstraction takes place. But what is apprehended implicitly is never for consciousness the same as what is apprehended explicitly. It is a great mistake to regard the difference made by abstraction as consisting merely in a "leaving out," e.g. in leaving out the special features of this or that triangle so that only its triangular nature in general is attended to. For, in the first place, the term "leaving out" suggests a mere ignoring or disregarding. But this is only possible when the abstraction is already made.

In the first instance what is required is not a mere ignoring but an express distinction between the generic nature and its specific determination. Again, the phrase "leaving out" is misleading in another way. It suggests that the abstract feature is already present to consciousness before other features are left out. But in fact the so-called residue no more exists for consciousness before the abstraction, than the statue exists in the block of marble before the sculptor has "left out" the chippings of his chisel.

It should be added that we do not become aware of the specific determinations as such until we become aware of the generic nature as such. The two cognitions are strictly correlated. You must be aware of the general nature common to various triangles in order to recognise this or that figure as a triangle of a certain kind.

Types of Ideal Construction.—I cannot pretend to give anything like an exhaustive account of the forms of constructive process. It is a subject which has hitherto received very inadequate treatment from psychologists. A brief reference to one or two main types of construction must here suffice.

Starting with a certain form of combination or relational scheme, we may transfer it to new matter. Thus in composing a sonnet, the general sonnet structure is transferred to new words. All literary imitations, conscious or unconscious, come under this head. A writer saturated with Elizabethan literature may write sonnet after sonnet unmistakably Shakespearean in rhythmic form, turn of expression, and arrangement of matter. Yet there may not be a single characteristic phrase or sentence which is actually borrowed from Shakespeare, and the writer may not be even aware that he is imitating.

Sometimes a definite model is expressly kept before the mind. Thus I may copy the rhythm of "Home they brought her warrior dead" by "Up they sprang and went away." In such parodies as those of Scott and Wordsworth in "Rejected Addresses," not only peculiarities of rhythm and cadence, but characteristic forms of thought and expression

are transferred to new and laughably incongruous matter. Comte's construction of the polity of his positivist state furnishes an example of formal transference on a grand scale. The positivist state is framed on the formal analogy of the Roman Catholic Church. The transfer was probably more or less unconscious in Comte's mind. A man steeped in the formulas and modes of procedure of formal logic will even unconsciously apply them to all kinds of topics. The student of physical science, when he turns his attention to psychology, is likely to attempt to fit the facts of mental process into a mechanical schema.

It is not, of course, possible to superinduce any form of combination on any kind of material. We cannot frame a hexameter verse of odours or colours, but only of articulate sounds. Even where the transfer is possible, it may be more or less imperfect. The form of a Latin hexameter is very imperfectly preserved in its English counterpart where accentuation is substituted for quantity. Further, the new matter may require and receive more or less modification, including omissions and additions, in order to fit it into the relational schema. As a very simple example we may take the case of the pronunciation of words being altered for the sake of a rhyme or pun. The attempt to fit the facts of mental process into a scheme of mechanical relations is likely to lead to grave omissions and falsifications. The same is true of any thoroughgoing attempt to construe the constitution of insect-communities, such as those of bees or ants, on the analogy of human society.

In a second group of cases, the point of departure is a given whole with a specific form of combination, and the construction consists in altering one or more of the partial items which enter into its composition. This is illustrated by our previous example of the mental substitution of gold for brick or stone as the material of a house. Other simple instances are the mental picturing of a white crow or of an unpapered room as it will appear when painted. Sometimes the attempted alteration may be seen to be inconsistent with other features of the whole with which we are dealing. This difficulty may be removed by mentally modifying these

features or by supposing them suitably modified without inquiring how. Or we may refuse to attend to the points of discrepancy. But if we are interested in these and also in retaining them unaltered, the construction is a failure. We may imagine a rope of sand, but we cannot, while keeping in view its composition, suppose it to be supporting a heavy weight. It will, however, do well enough if we merely wish to assign the making of it as a task for the devil.

In a third kind of construction, part of a whole is given to start with, but the rest is initially indeterminate, and has to be filled in according to some more or less definite plan of combination. A familiar example is that of one man finishing a story which another has begun, as Wilkie Collins finished "Edwin Drood." Another is the supplying of gaps in manuscript where parts of the text have been obliterated. Under the same head comes the reconstruction of the skeleton of an unknown species of animal where the only data are some of the bones and general anatomical analogies.

Serial order is a relational form which lends itself in a peculiar degree to this kind of construction. It is essentially constituted by relations of betweenness or intermediacy : *b* is said to be intermediate between *a* and *c* in a certain respect, when it is in that respect more like each of them than they are like each other. One point on a line is between two other points when it is nearer to each of them than they are to each other. One shade of grey is between two others when it is darker than the first and lighter than the second. If *b* is thus intermediate between *a* and *c*, and if *c* again is intermediate between *b* and *d* and *d* between *c* and *e*, *a b c d e* is an ordered series. Now if part of such a series be given so that we can discern the mode of its formation, we are always able to think of it as continued, and we are often able to supply the continuation in more or less definite detail. If it is given with gaps in it, we are able to notice these as such, and sometimes we can fill them in with more or less precision. In a graduated series of greys, where each is in a certain degree darker than its predecessor, there may occur a sudden leap to a grey which is much darker than the form of the series requires. We shall then notice the discontinuity, and accord-

ing as we are good or bad visualisers, we shall be able mentally to supply intermediate shades with more or less approach to precision. A very bad visualiser may not be able to do so at all.

In the case of a series of lines diminishing in length according to some fixed ratio, the process of filling in gaps will be for most of us much more easy and accurate. Where we have to do with numerical series, the process of transformation by which a transition is made from any one term to that which succeeds it is entirely within our power. Hence we can continue such progressions or supply gaps in them with complete precision. Given the series 1, 2, 4, 8, 16... we can prolong it *ad libitum*.

A good example of mental construction based on serial order is afforded by the search for missing links in biological development. Owing, let us say, to the imperfection of the geological record, there are apparent lacunae in the succession of the forms of animal life. But the biologist can to some extent mentally supply these, and he sometimes finds his conjectures verified by subsequent discoveries.

The Revival of Similars as determining Ideal Construction.—A young child finds a dead fly lying on the window-sill. He looks at it curiously. Then he picks it up, and moves it along the window-pane, doing his best to make it behave as he has seen living flies behave. What has taken place in the child's mind? First of all, the dead fly has called up the idea of a living fly crawling up the pane. This is mere revival of similars. In the next place the dead fly itself is ideally represented as crawling up the pane. This is an ideal construction based on the revival of similars. The dead fly is ideally transformed so as to assimilate it to the living fly. In the third place the child attempts by its own action, as far as may be, to actualise its idea, thus giving distinctness and vividness to its ideal construction.

This example is so far typical that in all ideal construction which takes its prompting cue from the revival of similars there is an attempt to make the similarity more complete by extending it to new points.

Further, it is plain that if the child continues to think of the fly as without spontaneous motion, he cannot succeed in ideally representing it as crawling up the pane. The nearest approach he can make to this is to represent it as being passively moved as he himself actually proceeds to move it. This again illustrates a point common to such constructions. The assimilative transformation is conditioned and modified by the differences so far as these are mentally retained and recognised in the process. The result is the production not of exactly similar features but of features which correspond to each other, as far as the circumstances will allow. We find α corresponding to a , and we mentally supply β corresponding to b .

In our illustration what goes on in the child's mind is probably only a play of fancy. He is therefore at liberty to ignore as he likes the actual features of the object he is dealing with so that his ideas may flow freely. He may represent the dead fly as alive and as creeping up the pane of itself. Such freedom is possible when we give the reins to imagination. But it is otherwise when we are endeavouring to think of things as they are, or when we are engaged in contriving means to practical ends. In such mental attitudes we submit ourselves to the control flowing from the nature of the object, and we are therefore bound to dismiss or modify ideal constructions which conflict with what we recognise as real.

In contrivance of means to ends the interest of thought lies in ideally representing a series of changes within our power to produce, and such that when they actually take place they lead up to a desired result. We need an ideal bridge which shall actually bear our weight when we attempt to cross it by putting our plan in execution.

In ideal construction of this kind, the revival of similars plays a most important part. Suppose that a man has occasion to throw a piece of paper to a great height. The paper flutters back again long before it reaches the place aimed at. Not only does it flutter back when he actually throws it, but he is compelled to think of it doing so when he ideally represents himself as throwing it. He can attain his end neither actually nor in idea.

But as his mind dwells on the problem the partially similar case of throwing a stone suggests itself. He can easily suppose himself throwing a stone as high or higher than his present mark. His difficulty will be solved if he can mentally assimilate the case of the paper to that of the stone,—if he can think of change in the paper, within his power to produce, which shall make it practically like the stone so far as the act of throwing is concerned. But in his past experience he has wrapped paper round things, and found that for purposes of manipulation the paper then became virtually part of the thing it was wrapped round. He proceeds mentally to assimilate the case of the present paper and stone to these remembered cases. He thinks of the paper as wrapped round the stone, and of himself as throwing the two together. Now his ideal construction moves freely to its end. An ideal bridge is made between actual conditions and the desired result. He has a plan which he proceeds to put into execution.

Perhaps he fails, not because he cannot throw his missile high enough, but because he cannot direct it with sufficient accuracy. He has then to resort anew to ideal construction. It may be that the shooting of an arrow from a bow occurs to him, and he hits on the plan of tying the paper to the arrow. Thus both distance and accuracy of aim are secured, and he is at length successful.

We may illustrate ideal construction in mere pursuit of knowledge as distinguished from practical contrivance by supposing a problem the inverse of that which we have just considered. Suppose the fact of the paper having been thrown successfully to be given as the starting-point of thought, and the problem to lie in discovering how it was done. This may lead to a train of thought analogous to that which gave birth to the original contrivance as we have described it. In this instance the datum to be explained is a result brought about by human agency. But the mental processes involved are essentially similar when we have to do with natural phenomena. Indeed, our insight into the constitution of the physical world is very largely based on the experiences gained in the course of our practical activity.

To pursue this topic farther would lead to an investigation

of the psychology of processes which are treated from a different point of view in logic under the head of inference by analogy, induction, framing of hypotheses, and the like. This would lead us too far. But the forms and conditions of mental construction, indicated however imperfectly in the present chapter, form the basis of such logical operations.

Conceptual Character of Ideational Process.—Conception consists in thinking of the universal in distinction from the particular. We have already seen that this takes place in the processes of comparison and abstraction. We have now to point out that ideational process in general is more or less conceptual in its nature. Ideal representation is always of universals, and of particulars only as instances or cases in which universals are particularised.

Universals are of two kinds, the general or distributive and the collective or, as it is sometimes called, concrete. The conception of a class or of anything as belonging to a class is concerned with the general or distributive universal. To think of what is general is to think of common characters as repeated or capable of repetition in a plurality of particular examples. When we think of horses as a class we think of certain characteristics, such as a certain kind of shape and a certain type of anatomical structure as found in this, that, and the other horse. When we think of an animal as being a horse, we think of it as a particular instance in which these common characters are exemplified.

The collective universal is the form of combination or the relational plan of a complex unity, thought of in distinction from the particular details which it inter-connects. This may be illustrated by our conception of any mathematical progression when we have once understood the process of transition from each term to the following. Take, for instance, the series 1, 2, 4, 8, 16 ... n . We have a collective concept of the series when we have followed it so far as to discern the law of transition from one term to another. This pervading form of connection is thought of in distinction from the particular terms which we have specified or might go on to specify.

Space and time are collective universals. Particular spaces are parts of space. They are not merely instances of a class concept; they are combined in a continuous unity which may be thought of in distinction from its particular parts.

Similarly, an individual person or thing is a collective universal. When we think of John Jones, we do not think merely of his particular state at a certain moment. We think rather of the systematic unity of his various successive states, actions, and relations, bodily and mental. Whatever states, actions, and relations have entered or will enter into this systematic unity we regard as belonging to the individual existence of John Jones, even though we do not know what they are.

It is plain that ideal construction must be a conceptual process. The relatively new products which it forms are gradually built up by recombining in new ways partial features and aspects of the concrete detail of perceptual experience. In other words, it is a synthesis of universals, each of which gives a further specification of what the others leave indeterminate. We can no more use the total content of perceptual experience in the process of ideal construction than the builder can use for his purposes the stone as it is found in the quarry. In both cases putting together presupposes taking to pieces.

The breaking up of the content of perceptual experience into its partial aspects may be called conceptual analysis: the reconstruction may be called conceptual synthesis. Both processes go on together in intimate correlation. Not only is synthesis based on analysis; the need for relatively new construction brings with it further conceptual distinctions. The process of putting together prompts and determines the process of taking to pieces. The grand instrument of conceptual analysis and synthesis is language, and we shall gain a clearer insight into its nature when we come to treat of this topic in Chapter XIII.

In ideal construction the materials combined are universals of the general or distributive kind. It is the special function of the collective universal to furnish a plan or guiding principle of synthesis. The more complex and important types of

constructive process, such as we have previously described, start with a certain form of combination or relational scheme and proceed to fill in the details by progressive specification.

It is not merely processes distinctly recognisable as constructive which deal with universals in their distinction from particulars. This holds good of ideal representation in general. It holds good even for the case in which we recall a particular series of events in our own past history, where our dominant interest is in merely reproducing past perceptual experience without transforming it. Forgetfulness and in particular the fragmentary and indistinct character of mental imagery are sufficient to make the recall partial and indeterminate. Besides this, revival depends on previous attention. We reproduce in the main only those partial aspects of the concrete experience which we have noticed at the time. The characters which we recall form a conceptual extract from the concrete whole as originally experienced.

It is true that we think of the particular as being particular. But we are consciously unable to do justice to its particularity, to its concrete and fully determinate detail. The characteristics through which we represent it are contrasted as general with their particular embodiment in the fact we are trying to represent. But even if ideal recall were more complete and determinate than it seems ever actually to be, there would still be nothing in the characters recalled capable of stamping the ideally represented object as a unique particular. It is always possible that these characters might also belong to other particulars, that they might be repeated in a plurality of instances.

For ideal representation all particulars are particularised universals. We cannot ideally represent any fact, thing, or event as particular and singular except by reference to something else which is already assumed to be particular and singular. This would lead to an endless regress, were it not that a final centre of reference is found in the present moment of consciousness. Whatever I think of as particular and singular is individualised for me by its continuous connection, however indirect and remote, with the here and now of my actual present experience.

CHAPTER XIII.

LANGUAGE.

Communication of Ideas.—One man, *A*, communicates his ideas to another, *B*, when he acts so as to prompt and enable *B* to represent ideally what he himself is thinking of or has been thinking of. Similarly, a man may be said to communicate his own ideas to himself when he acts in such a way as to prompt and enable himself to think again of what he has thought of before, *e.g.* when he makes a note for future reference instead of merely trusting his memory. Ideal communication in this wide sense takes many forms, of which language is only one.

Every material arrangement which has been purposely shaped by human beings so as to fulfil a plan forms a more or less permanent record of the trains of ideas of which it is the outcome. If I put my books and papers in order with a view to to-morrow's work, this prearrangement recalls to my mind, when to-morrow arrives, my preformed scheme. If, owing to interruptions, a week elapses before I can take up my task, the prearrangement of books and papers will still remind me of what I had intended to do, though without it my memory might have failed me, so that I should have been compelled to think out afresh a plan of procedure.

When a man is engaged in constructing a tool or in building a hut or the like, his partially completed work prompts and enables him to rethink the thoughts which are embodied in it, and so to proceed both with head and hands from the point where he previously left off, even though a considerable interval of time has intervened. If what he has already effected is destroyed, the restoration may require a renewal of mental as well as of bodily labour.

Thus the material embodiments of ideal construction are means by which a person communicates his own ideas to himself. They are also means by which ideas are conveyed from one mind to another. In observing and using what the hands of his fellows have wrought, a man is prompted and enabled to follow out for himself the lines of thought which guided their actions. If he finds, let us say, an unfinished hut, he may understand the partially unfulfilled purpose which it embodies, and he may proceed to complete it according to the plan of the first builder,—a plan which may differ more or less from any that he would himself have independently devised. Similarly, if he finds some one actually engaged in building, he may enter into the other's ideas so as to co-operate in their fulfilment.

Ideal communication of this kind is of enormous importance to the history of the human race. Mankind has gradually shaped the material environment so as to embody human ideas and fulfil human purposes. In a civilised country like England hardly a single object meets our eyes which is not more or less shaped or arranged by human agency in conformity with ideally represented plans.

There is therefore hardly anything in our material environment which does not prompt and enable us to rethink the thoughts of our fellow-men. Houses, clothes, steam engines, corn fields, gardens, roads, knives and forks, loaves of bread, are all expressions and abiding products of trains of ideas which have been thought out by our ancestors, and in a far less degree by our contemporaries. They are the results of the co-operative thinking and willing of the human race, and in learning to understand and utilise them we renew in ourselves the processes of ideal construction which they express. We enter into our spiritual heritage.

Such embodiments of ideal contrivance as we have hitherto considered are not primarily designed as means of communication. When a man builds a hut, his primary purpose is to obtain warmth and shelter, not to record his own ideas or communicate them to others. But there are cases in which communication is the principal end of our action. We may act with the express intention of directing our thoughts along

certain lines or of making others think of the same objects which engage our own attention. This is so when a person ties a piece of string round his finger so as to remind himself of something which he has to do. He first attends to his proposed action in relation to the piece of string. He then ties the string round his finger so that it may be permanently present with him as a reminder. The string round his finger, so far as it fulfils its function, is a sign.

A sign is some action or perceptible result of previous action expressly intended for communication of ideas to self or to others. We use a sign when we make a mark to show how far we have succeeded in throwing a stone or shooting an arrow. A milestone is a sign. So is a landmark to fix the boundary between adjoining estates, or a heap of stones meant to indicate the highest point on a mountain. Language is a system of signs, but one of a very peculiar kind. We have now to explain wherein its peculiarity consists.

Language.—To understand the nature and function of language we must bear in mind the general character of ideational process as concerned with universals. Language is essentially an instrument of conceptual analysis and synthesis. Its function as a means of communication is essentially bound up with its function as a tool to think with,—an apparatus for directing and controlling the course of ideal representation.

The several signs which compose a linguistic system are each connected with some universal aspect or feature of concrete experience. Each of them serves to fix attention selectively on this universal in distinction from the particulars which exemplify it, and to recall this universal whenever it is itself mentally reproduced or perceived anew. Thus language is an instrument of conceptual analysis. It is also an instrument of conceptual synthesis. For when a series of linguistic signs is either perceived or mentally imaged in appropriate order, attention is successively focussed on universals which supplement each other, uniting so as to form an ideally represented whole.

Suppose that I begin to name in a desultory manner the

various objects which now fall within my field of view. I name successively grass, fields, daisies, trees, this house, that stream, the gate on my left. Each word as I use it fixes my attention on some partial feature of the total scene, and each of these partial features is a universal. There is no single word used by me which might not be also applicable to other particular objects of like nature.

This holds true even of such terms as "this" and "that" or such a phrase as "on my left." "This" means "what I am pointing towards" or "what I am looking at," or "what I have just mentioned," or "what I am now interested in." But these relations to myself are of a general character. I may point towards, look at, mention, or be momentarily interested in many and various particulars. The word "this" does indeed direct my attention to some one particular thing. But it does not do so merely in virtue of its meaning as a linguistic sign. It does so because the circumstances under which it is applied are particular. My finger at this particular moment is pointing in the direction of just one particular cow and no other. Hence when I say "this" cow, I thereby fix my attention on the particular cow to which I am actually pointing. The general meaning of the word "this" is particularised by the particular condition under which it is used.

The same holds good of proper names. Ultimately they apply to particular persons or places because they have been given to these persons or places under particular perceived conditions which restrict and determine their application.

The desultory naming of the features of a scene which is actually spread out before the eye is predominantly a process of conceptual *analysis*. As the basis and presupposition of the analysis there is indeed a synthesis. But the synthesis is perceptual. The whole within which conceptual aspects are distinguished is initially given in its concrete unity as a total scene presented to sense-perception. But if, instead of naming at random this and that object within the field of view, the spectator proceeds to describe what he sees in a connected way, his mental process is clearly one of conceptual synthesis as well as analysis. An ideal whole gradually develops before

his consciousness through the successive combination of its conceptual components, each supplementing the others.

This is still more evident if he subsequently describes the scene to another person who has not been present at it. In this case the speaker himself no longer has the help of actual perception, so that he has to reproduce his previous experience bit by bit through conceptual synthesis. For the hearer the perceived whole has never existed ; hence his entire view of it is a product of ideal construction. It grows up gradually in his mind through a process of conceptual synthesis, prompted and guided by the words which successively strike his ear.

The universals which constitute the meanings of words, and which unite so as to form a conceptual synthesis when the words are successively combined in connected discourse, are themselves to a very large extent products of previous conceptual synthesis. At the outset, indeed, conceptual process takes its point of departure from perceptual experience and the first universals in order of time are merely conceptual extracts from concrete data. But as ideal construction proceeds these universals are themselves submitted in a greater or less degree to conceptual analysis and reconstruction. The meanings of the corresponding words are characterised, described, or defined by combining other words representing universals of greater generality.

Such words as dog, chair, orange, serve in the first instance merely to direct a child's attention to certain characters of perceived particular things which they possess in common with other perceived particular things. They stand merely for conceptual extracts from concrete experience. But later on the child is able in some degree to express what he means by them by using other words, without needing to point to concrete examples. He can say that an orange is a round thing with a yellow skin having juicy stuff inside it which is good to eat.

Such concepts as that of a dog, chair, or orange are primarily derived in an unanalysed form from perceptual experience. So far as this is the case subsequent ideal construction only fulfils the function of making them articulate by definition and description. But it may also amplify the concept by

adding to it characters which have not been directly presented in perceptual experience. Thus the child may be told that oranges grow on trees. This becomes, for the future, part of what he means when he uses the word "orange." If he has never seen an orange tree with fruit on it, the characteristic of growing on trees has been incorporated in his concept of an orange purely by conceptual synthesis.

Many concepts are wholly or mainly formed through conceptual synthesis with little or no basis in corresponding concrete experiences. Evidently, objects which are known only through the descriptions given by others are represented only by an ideal construction. Thus my conception of the great wall of China is entirely the result of an ideal construction made possible by the reports of travellers. The same is true of my conception of the ancient Britons, or of Julius Caesar, or of the history of Jack the Giant-killer.

All collective concepts which possess a high degree of complexity are mainly formed in this way. In the main the British constitution signifies for me the unified result of a highly complex conceptual synthesis. My experience of it in the concrete has been exceedingly partial and fragmentary. The same holds good for such collective concepts as that of the animal kingdom, organic life, the solar system, my friend Jones, the universe.

To sum up : As an instrument of thought, language fixes as permanent possessions of the mind the results of conceptual analysis and synthesis so that they may be utilised as occasion demands in subsequent ideal construction. As an instrument of communication it is the means by which an individual prompts and controls processes of conceptual analysis and synthesis in the minds of others.

These two functions of language are intimately united and interdependent. It is only in so far as man, by the use of language, signifies his own thoughts to himself, that he is enabled to make others think corresponding thoughts. On the other hand, conceptual thinking could not pass beyond a very rudimentary stage in the absence of such ideal communication between different minds as language alone makes possible. The development of ideal construction is essentially

a social affair. *A* communicates a train of ideas to *B*; *B* further develops it in accordance with his own past experiences and the results of his own past thinking. In this way many minds co-operate in the formation of conceptual systems as if they were a single mind.

Apart from such co-operation it may be doubted whether ideal construction could develop so far as to be of much service. It may be doubted whether it could be of much use to a solitary animal.

Language of Natural Signs.—It is only oral speech which can in strict propriety be called language. But by a convenient extension the term has come to be applied to other systems of signs fulfilling essentially similar functions. Thus we speak of written language, of the finger language of deaf-mutes, and of the language of imitative gestures.

The signs which compose a language in this wide sense may be of very various natures. They are more or less fit for their function according as they fulfil more or less adequately certain requirements. They are better adapted as vehicles of thought and communication the more uniformly and unconditionally they are producible at will independently of variable circumstances, the more easily and clearly perceptible they are when produced, and the more rapidly they can succeed each other without loss of distinctness.

All these requirements are most adequately met by oral speech. Under normal conditions, a man is always able to utter articulate sounds at will. The sounds uttered are easily perceptible both to speaker and hearer, and they are distinctly apprehensible even when they follow each other with great rapidity. The manual alphabet of the deaf and dumb satisfies the same condition in a large measure, though not so completely. Written language is not so uniformly producible at will as oral speech. It presupposes the presence of writing materials. But it has the great advantage of not being evanescent. When once produced it persists as a permanent record, *Littera scripta manet*.

Our ordinary oral speech and writing, and the artificial finger language which is taught to deaf-mutes, are all con-

ventional systems of signs. The nexus between sign and thing signified depends merely on their conjunction in past experience, on their having been attended to together. Otherwise there is nothing in the nature of the sign itself tending to suggest its meaning. The sound of the word "cow" has no more intrinsic connection with the animal than any other sound.

It is otherwise with what is called the language of natural signs or imitative gestures. A natural sign has some feature in common with what it represents, and it is this community of nature which primarily forms the link of connection between them. If I imitate the mewing of a cat, this tends to call up the idea of the animal, because the sound I make more or less resembles the sound cats make. Hence any person who had heard a cat mew might understand me at once. The word "cat," on the contrary, would be unintelligible except to those who had previously learned its application.

In all probability the most primitive form of language was a system of natural signs,—of imitative gestures and sounds. It is hard to see how a conventional system could become established in the absence of a degree of mutual understanding and of insight into the nature of signs which already presuppose the use of some kind of language. But natural signs are under favourable conditions self-interpreting, and their first production is easily explained as a consequence of the tendency of vivid ideas to issue in corresponding movements.

The motor tendencies of ideas, in so far as they cannot take shape in practical adjustments, are reduced to movements of expression. The idea of eating will not enable a man to eat, unless food is within his reach. But he can at least place his hand on his stomach and imitate the movement of mastication with his mouth. Similarly, the idea of his own warlike prowess will not enable him to fight unless an enemy is at hand. But there is nothing to prevent his brandishing a weapon and going through the pantomime of fighting.

Such imitative actions serve to sustain and develop the corresponding ideas, and they are at the same time a means of communicating these ideas to others. If a hungry man, *A*, is in presence of another man, *B*, who has a store of food,

A's idea of food will be an idea of food as coming from *B*, and in using imitative gestures he will endeavour to draw *B*'s attention to them. He will use them as means of determining the flow of ideas in the mind of *B*, and so of obtaining food for himself.

Natural signs fulfil the same essential functions as conventional signs, though far more imperfectly. They are instruments of conceptual analysis and synthesis. Each imitative gesture expresses a universal, and the combination of such gestures in a context expresses a synthesis of universals, each determining what is indeterminate in the others. In this way prolonged descriptions and narratives are possible through natural signs alone, and there may be complex interchange of ideas between persons who have had no previous intercourse, and who possess no conventional language in common.

But imitative gestures have great and obvious defects as compared with purely conventional signs. It is possible to select at will the most convenient and manageable material for conventional language. Thus the articulate sounds of ordinary speech are both producible and perceptible with more ease, readiness, precision, and celerity than is possible in expressive pantomime. They are producible when the hands and the body generally are otherwise occupied ; they are perceptible in the dark, and at a distance, when gestures appealing to the eye would be useless.

Besides these external defects, natural signs labour under a more essential short-coming. They are incapable of expressing universals of a relatively high order of generality,—universals which come to be conceived through the farther conceptual analysis of the results of previous conceptual analysis. “To make,” says Tylor, “is too abstract an idea for the deaf-mute : to show that the tailor makes the coat, or that the carpenter makes the table, he would represent the tailor sewing the coat and the carpenter sawing and planing the table.” It is difficult or impossible to express imitatively what is common to all kinds of making in abstraction from what is specific in this or that kind of making. But if we use a conventional sign, such as the word “make,” the difficulty disappears.

Another allied deficiency of gesture language is its incapacity

to furnish brief and compact expression for the unified results of prolonged and complex processes of ideal construction. Such a collective concept as that of the British Constitution could not perhaps be expressed by mere pantomime at all. Certainly it could not be expressed by a single imitative gesture or by a short series of such gestures.

Owing to their superior effectiveness as vehicles of thought and communication, the conventional signs of oral speech have in the main displaced imitative gestures. Conventional systems are transmitted from parents to children; they represent in their structure and vocabulary the cumulative result of the co-operative thinking of many minds in the past history of the race. Every child in learning his mother-tongue assimilates in outline a whole system of conceptual analysis and synthesis, which has been gradually developed by the mental activity of past generations. I now proceed to give some indication of the mode in which children enter into possession of this spiritual inheritance.

Development of Language in the Child.—Long before the child begins to use or understand words, he acquires what we may call phonetic material, which is afterward utilised for the expression of thought. He exercises his vocal organs in the production of various sounds. At first this vocal exercise is purely spontaneous; but as time goes on, it becomes increasingly prompted and guarded by imitation.

The earliest cries are primitive expressions of emotion and organic sensation,—hunger, fear, surprise, impatience, comfort, exhilaration. Vowel sounds such as *ah*, *oo*, *a* occur first; they soon become strung together in such series as *ai*, *ä*, *aw*, *ä*. The child lies on his back and crows. The vowel sounds then become combined with consonants so as to form syllables, *fra*, *ma*, *ba*.

By the time this stage is reached, the continuous stream of babbling utterance is no longer expressive of special emotions or organic states. It is a favourite form of play. The child rejoices in the sounds produced, and in his own power of producing them, and in the motor activity of larynx, tongue, and lips. Hence, he persists in his occupation for the sake of

the pleasure it affords. He tends to repeat sounds which interest him; hence, the reduplications which form so prominent a feature of infantile babble.

Through such spontaneous activity the power of producing a variety of syllabic sounds is acquired. This is the necessary basis and presupposition of the imitation of the sounds made by others. For imitation is only possible on condition that the imitator is already able to do something more or less similar to the act which he copies.¹

Imitation is at first very imperfect. The sounds uttered by the child become assimilated to those which he hears only by a slow and gradual process. At first his imitative speech rather resembles his own spontaneous utterances than the words imitated. He simplifies complex sounds, saying *poot* for *puss*, *bik* for *biscuit*, *ka* for *candle*, *but* for *butter*, *hamfest* or *hanky* for *handkerchief*, *pinkle* for *periwinkle*. The reduplication of infantile babbling recurs and persists in the imitative stage. The child says *moo-moo* and *gee-gee*. Mothers and nurses have learnt to meet the baby requirements by using a traditional nursery language offering for imitation what experience of the past has shown to be most easily imitable.

Even before the imitative stage is reached, children show a certain understanding of words which they hear. But we must not assume that this "understanding" involves at the outset the proper use of verbal signs as expressive of ideas,—as instruments of conceptual analysis and synthesis. Suppose that a baby hears the word "mamma," and that in consequence he turns his head and eyes until he sees his mother, and then he stretches out his hands, smiles and crows.

Exactly the same effect might have been produced by the sound of his mother's voice, by the rustle of her dress, by her touch, or by her appearance in the dim margin of his field of view. If it had been so produced the psychical process might have been merely perceptual in its character. It might have consisted merely in a motor reaction, prompted by a preformed association. This is the only legitimate interpretation when the child's general behaviour indicates that its mental processes are mainly or wholly in the perceptual stage.

¹ See Chapter VIII., p. 74.

Now, in the absence of other evidence, we have no reason to suppose that the sound *mamma* operates in any other way than the sound of the mother's voice, the rustle of her dress, her touch, or her appearance in the margin of the visual field. The mere fact that in the case we are considering the child's behaviour is evoked by what for us is a *word*, really makes no difference. At a somewhat later stage, children spontaneously pronounce single words when they are attending to associated things, persons, actions, or situations. In itself this does not necessarily imply any essentially new development. The sight of an object may prompt the motor reaction of vocal utterance in accordance with a preformed association, just as it may prompt the motor activities of grasping and lifting to the mouth.

Such perceptual use and understanding of words is common among the higher animals, such as the parrot and the sheep dog. But the normal human child does not remain as they do, mainly or wholly on the perceptual level. There supervenes a stage in his mental history in which he becomes increasingly capable of distinguishing the universal from the particular, and of ideally representing absent objects by means of their universal characteristics.

Language then becomes the most important and indispensable instrument for developing this capacity. As the association becomes fixed between a name and certain features common to many otherwise variable objects, the child in pronouncing the name makes these common features, as such, emphatic and prominent in consciousness, in distinction from the concrete detail of perception. The name thus becomes an instrument by which he controls the direction of his own mental activity.

The beginnings of this stage of development are manifested in his outward behaviour. He repeats the name again and again in attending to the object with a zest and evident enjoyment sufficient to show that in doing so he is going through a mental operation of absorbing interest. It is true "greeting of the spirit." When the child sees a caterpillar and calls it a pin, he thereby singles out and brings into the focus of attention the character in which it resembles a pin,—

its similar relation to the act of picking up. Here we have in rudimentary form the peculiar analytic function of language. The use of the word breaks up the concrete content of actual perception into general or abstract features, and enables us to concentrate attention on these separately. To a certain extent of course selective attention of this kind may take place without verbal signs. But without such signs it can be only evanescent and fluctuating.

It is language alone which gives a permanent power of concentrating attention at will on *universal* features—features which could not be singled out by any adjustment of the organs of sense. When the milk in the bottle is all gone, when a flame is put out, when music ceases, when a drawer is closed, there is a certain common character belonging to all these experiences. They all involve the peculiar experience of missing a continuation. But this character could not be marked off for separate consideration in a definite and permanent way without the use of language. The application of the name makes this possible. One child, for instance, used the word "attā," *i.e.* all gone, in these and similar situations.

Hearing words applied by others has, of course, a like effect, and also a further utility. The child's thoughts are shaped and guided by others as he could not shape and guide them himself. The words which he hears lead him to discriminate conceptual features of a given situation which he would not otherwise have singled out for separate notice. All this happens when words are used in reference to particulars actually present to perception. The same words, when they are heard in the absence of the corresponding objects, will call up ideal representations; and their actual utterance or the mental imaging of them by the child will enable him both to call up ideas at will, and to fix and detain them as objects of attention.

The next step is the combination of words in a context so as to characterise a complex situation. Each word has its own distinctive meaning, and the meanings unite and supplement, and more or less modify each other, so as to form an intelligible whole. In this way the synthetic function of speech begins to base itself on the analytic.

Probably the commencement of this development is found in the understanding of verbal combinations which the child hears from others, rather than in his own spontaneous utterances. I may refer to a very elementary illustration drawn from my observation of a child of my own. He had so far learned to understand the words "dada's nose" that he promptly touched the corresponding object when he heard them. He had learned, at least in a perceptual way, to connect the word "baby" with himself. But when I asked, "Where is baby's nose?" he was at first either merely puzzled, or pointed to mine. At a later stage he not only distinguished baby's nose from dada's nose, but could readily understand when the respective noses of aunts, uncles, and other friends and relatives were mentioned. The word "nose" had then become for him the sign of a universal capable of having its meaning variously determined in varying verbal contexts.

Very soon the child commences freely to combine words on his own initiative, so as to express conceptual synthesis. A baby begins by simply saying "baba" when he is sleepy, and "mamma" when he sees his mother. It is distinctly a new departure to say "mamma baba" when he wants to sleep in his mother's arms. At first these rudimentary sentences consist of only two words, e.g. "good bow-wow," "naughty bunny."

Most often these simple verbal combinations are used where we should frame much more elaborate sentence-structures. But we must not suppose that the baby sentence is in reality the psychological equivalent of ours. The baby says "papa cacker" where we should say "papa has got crackers." He has distinguished and combined the concepts expressed by "papa" and "cracker." But we must not assume that he has distinguished the concepts which we express by "has" and "got" or by the combination "has got." So when he says "auntie cake" in presence of the fact that his aunt has given him a cake, we must not suppose that he really performs the conceptual analysis and synthesis corresponding to the missing words "has given me." Usually toward the end of the second year more complex sentences are framed, e.g.

“Dada toe toe ba”—Father is to go and put his toes into the water, “Moo ku baby shee”—Baby sees moon in the sky.

Along with the increasing power of constructing verbal combinations there is a corresponding increase in the power of interpreting the language used by others. It is most important to note that in this process the child is perpetually learning to understand unfamiliar words and to attach more correct and precise meanings to those which are relatively familiar. What others say is often couched in terms which his previous experience makes only partially intelligible. To the meaning of some words he has little or no clue, or a wrong clue from previous acquaintance with them. But the words he does understand suggest an ideal construction which invests the others with meaning. He interprets them by their context as we may interpret occasional words which we do not know in reading a foreign language.

The results thus obtained are continually being sifted, and either corroborated or modified or annulled by the reception which his own application of language meets with from others. Sometimes his use of words and phrases gains him wondering admiration; sometimes it excites laughter. Sometimes he fails to make himself understood at all; sometimes his mistake is formally pointed out and the right language suggested to him. Thus by a process of constant experiment with varying successes and failures, he gradually masters his mother-tongue and the system of conceptual analysis and synthesis which it represents.

CHAPTER XIV.

THE WORLD AND THE SELF AS KNOWN THROUGH IDEAL CONSTRUCTION.

Self-consciousness and the consciousness of an external world develop concurrently in the most intimate union and interdependence. There is a constant and continuous give and take between them. Each is perpetually borrowing of the other and repaying the loan with usury. This is true at the perceptual level. The inner being of the external things is apprehended only as a counterpart of the percipient's own subjective experience. On the other hand, it is only in contrast with external things and in relation to them that he becomes distinctively conscious of self. Self-projection is a condition of self-consciousness.

When we turn from perceptual process to ideational we find this interdependence of self-consciousness and world-consciousness assuming indescribably complex and varied forms. The growth of the individual's acquaintance with the external world is in itself an extension of his own being—a development of the object of his own self-consciousness. As his knowledge of his material environment becomes more and more extensive and systematic, his control over it becomes greater and his interest in it becomes progressively more varied, more comprehensive, and more highly organised.

But all this could not take place through the individual's own unaided efforts. The ideal construction through which the external world becomes known is a social function. Many minds co-operate in the process and have a joint property in the product. All progress in such co-operative thinking and willing involves progress in mutual understanding, sympathy, and interest.

This again essentially implies a further development of self-

projection. Each individual can only represent to himself the thought, perceptions, emotions, desires, volitions, etc., of his fellows by reference to his own subjective experiences. He must interpret the manifestations of their mental life by conceptual analysis and reconstruction of the material supplied by his own mental life. In this process his own self-consciousness inevitably becomes more and more definite and distinct. He comes to know himself in learning to know others.

Further, this consciousness of self is always the consciousness of a socially related self. The individual not only becomes aware of resemblances and differences between himself and others ; he becomes aware of himself as related to others in the social unity of co-operative thinking, willing, and acting. His own thoughts, volitions, and actions appear to him as fragmentary portions of a whole, depending for their meaning and efficiency on their relation to thoughts, volitions, and actions of others. His view of the attitude of others towards him, what they think of him and expect from him, and how they feel in relation to him, becomes an integral part of his own self-consciousness. There is thus progressively developed in him a vast range of organised interests having for their object the psychical life of his fellow-men. This again constitutes an extension of his own being. His social interests are indeed the most important part of himself.

To trace in detail the correlated development of self-consciousness and consciousness of the external world is a task which vastly exceeds our limits. We must be content to note only certain points of special interest. In doing so it will be necessary for purposes of exposition to deal separately with aspects of the total process which are in fact inseparably united.

General Nature of Antithesis between Self and External Reality at the Ideational Level.—The distinction between self and external object as it exists for ideal representation partly falls within the process of ideal construction itself and partly consists in a contrast between idea and percept. The case of practical contrivance is typical and of primary im-

portance. In practical contrivance we endeavour to construct an ideal bridge between our present situation and a desired result. Our interest demands that the bridge shall be such as to bear us to our destination when we actually come to use it.

But this is possible only so far as our ideal construction conforms to an ideally represented reality which is beyond our control. Just as motor activity in perceptual process can only attain success by adjustment to perceived conditions, so practical contrivance essentially involves adjustment to similar conditions as ideally represented. In forming our plan of procedure we have to conform the course of our thought to the ideally represented combination of circumstances constituting the pre-existing situation—to the ideally represented changes in this situation which we foresee as consequences of various possible modes of behaviour on our part.

Whatever in fact would hinder or facilitate the body's power of action in executing a plan also hinders or facilitates, so far as it is ideally foreseen, ideal construction of the plan. In attempting to escape from a prison a man may be actually stopped by a wall which he cannot climb. In framing a plan of escape, the thought of the high wall will block the flow of ideal construction just as its actual presence would block the course of motor activity. In actually attempting to escape, the discovery of a ladder might overcome the obstacle presented by the wall. Similarly, the obstacle to ideal construction presented by the thought of the wall might be surmounted by the ideal anticipation of finding a suitable ladder in an accessible place.

On the perceptual level the externally real consists in perceived conditions to which motor activity must adapt itself if it is to be efficient in the attainment of its ends. In ideal prearrangement of future action, the externally real consists in ideally represented conditions of analogous nature, to which the flow of ideal construction must adapt itself in order to be successful.

On the other hand, whatever either in perceptual or ideational process is merely dependent on subjective initiative is to that extent not regarded as belonging to the external

object. On the perceptual level whatever variations of our sense-experience are uniformly producible at will by free motor activity, are so far referred to the self rather than to the not-self. Similarly, the flow of ideal representation is regarded as a process in the self, so far as it depends merely on subjective interest working through the mechanism of preformed associations.

Thus in practical contrivance, the pursuit of the end is a process of our own minds depending on our interest in a desired result. It is we who are forming a plan. It is our preformed associations and present interest which determine the successive recall and disappearance of ideas in a train. It is we who try this and that ideal combination in turn though we have to test them by reference to conditions which we think of as determined for us and not by us. But even the act of submitting to this test is ours. We submit ourselves to it because of our interest in the end which we are pursuing. It is we who seek for the objective control proceeding from the nature of the ideally represented facts, and in so far as we fail to find it we are baffled. We are active in order that we may be passively determined, and we can be passively determined only in so far as we are active. The whole process is one of interaction between subject and object. The subject experiments in the way of ideal construction, but it is the object which determines the result.

Besides this antithetic correlation of self and the externally real within ideal process, ideas, as such, are contrasted with perceptual experience as belonging more distinctively to the self,—as involving a less direct relation to external reality. In discussing the perceptual consciousness of self and external object we saw that the line of demarcation between them comes to be drawn at the surface of the body. The skin and what lies inside it is apprehended as belonging to the self; what lies outside it is apprehended as not-self.

Now ideational process occurs independently of the actual presence of external things in perceived relations to the body of the percipient. We can ideally represent what is absent in space or past in time. Perception ceases when we go away from the thing perceived or turn our sense-organs in a different

direction. But we can, so to speak, carry our ideas about with us, wherever we go. They are independent of the changing spatial relations of outside things to our bodies.

On the other hand, ideational process is positively continuous with bodily experience ; it is connected with various phases of emotion and the attendant organic sensations ; it occasions varying tension and relaxation of the muscles and varying movement of expression or of practical activity. Thus it comes to be regarded as a process going on inside the body independently of the changing environment. It comes to be regarded as a process taking place in the self apart from external things. By a metaphor which common sense is prone to accept as literal fact, what is ideally represented is looked on as a mere copy of the external thing taken from the perceived original.

The same result is also reached in another and even more important way. In practical contrivance and in the pursuit of knowledge through ideal process we seek for objective control from the ideally represented objects. But in many respects this objective control is accorded to us in a comparatively imperfect measure, so long as we confine ourselves to ideal representations. We put questions to which we can obtain no decisive answer with the data at our disposal.

In planning to escape from a building in which he is imprisoned a man may ask in vain whether he will or will not be able to climb the outside wall, whether he will or will not be able to find a ladder. In the actual execution of his ideal scheme these doubts are settled. What was indeterminate for ideal construction is unambiguously fixed in the corresponding perceptual experience.

But perceptual experience not only yields fresh data which settle questions otherwise unanswerable ; it may also yield fresh data which are inconsistent with the results of ideal construction. The best laid plans may fail when they are actually tried. They are always liable to break down, owing to unforeseen circumstances. The prisoner may be proceeding on the assumption that once he is over the wall he will have no further difficulty. In *fact*, he may find his escape barred by another wall or by men keeping guard.

Where such conflict arises between perception and idea, it is of course the ideal representation which must give way. Ideal construction which seeks to know external reality may transcend perceived facts; it may extend knowledge beyond the limits of what is perceptible by the senses. But it defeats its own end if it contradicts perceptual data; for it is ultimately founded on perception. Its materials are drawn through conceptual analysis from the concrete content of perceptual experience, and its function is to connect detached data of perception in a system through a process of conceptual synthesis. If the data refuse to take their place in the system, the ideal construction so far fails and must be remodelled.

Hence the continually recurring discrepancies between ideal anticipations and corresponding perceptions lead us to regard ideal representation as relatively unreal. We contrast our opinions, expectations, hypotheses, conjectures, as possessions of our own minds, with what we call the facts of actual experience as something independent of us.

It is now time to call to mind what we have been disregarding—the fact that ideal construction is a social function and not the work of the individual in isolation from his fellows. The perceptual data which it utilises and unifies are given to many minds, and many minds co-operate in the process of unification. Our next step will be to discuss the psychology of social communion, or of inter-subjective intercourse as it has been called. We shall then consider more specially its influence on the development of self-consciousness and the consciousness of the external world.

Growth of Intersubjective Intercourse.—From the first there is a marked difference between the child's relations to persons and his relations to inanimate things. It is not merely that the bodily appearance and movements of other human beings resemble his own. What is of even greater importance is that their behaviour is connected in an altogether peculiar manner with the furtherance and hindrance of his interests. In general, inanimate things do not spontaneously change so as to adapt themselves to his needs and requirements or to

interfere with his actions. In order to make them subservient to his will when they are not so already, he must control them by active movements in the way of direct or indirect manipulation. He must come in contact with them and put forth effort against resistance.

But the behaviour of nurse and mother spontaneously adapts itself to the child's varying wants and impulses without having to be controlled in this way. The baby may stretch his hand towards his rattle, but if it is not within reach, it does not move toward him and place itself in his hand of its own accord, however much he may cry. But if the nurse is present, she may bring it to him. Her action thus fits in to his as its continuation and completion. Grown-up persons are perpetually intervening to satisfy requirements which the child cannot fulfil at all, or can only fulfil in part, by its unaided activity. From early infancy the unpleasant sensations arising from tight and damp clothes, from cold, hunger, and indigestion, are continually being removed by nurse or mother. They are also constantly doing things to amuse or console the baby, making noises for it, singing to it, fondling it, seeking to direct its attention to attractive objects, playing peep-bo, rolling balls, etc.

As the child's activities become more varied and complex, he meets with more varied and complex co-operation in them from his social environment. He finds others constantly intervening to help him, and he learns to seek their intervention and to count on it. The means which prove effective in influencing their behaviour and gaining their assistance consist precisely in such actions as have no effect on inanimate things. He may get an apple peeled by pushing it toward his father or mother, but not by pushing it toward the knife.

In general, it is just at the points where he finds himself impotent to attain his ends by manipulation or analogous action on external things, that other persons intervene to supply what is wanting to continue and complete his otherwise unavailing efforts. When he is beginning to learn to walk, his mother catches him just when he would otherwise fall. At a certain stage of development, he takes an almost inexhaustible pleasure in letting things fall on the

floor. But he cannot pick them up again, and therefore without assistance this amusement would be soon cut short. It is the nurse who picks up the spoon or rattle and restores it to him after each fall. Her action is not his, but it is the complement and continuation of what he does himself, the complement and continuation required for the fulfilment of his interest. It is what he would do for himself if he could.

Under such conditions, the child must interpret the behaviour of others as expressive of a subjective experience like his own. In merely affirming so much, however, we give an utterly inadequate statement of the nature of his social consciousness at this stage. As he finds and seeks and learns to count on social co-operation, he not only becomes aware of others as having perceptions, ideas, and interests like his own ; he becomes aware of them as perceiving, thinking about, and interested in the things which he himself perceives, thinks about, and is interested in. Further, he becomes aware of them as cognisant of and interested in himself. He becomes aware of them as concerning themselves with his own wants and requirements, and co-operating with him for their satisfaction.

Only so far as he thus learns to interpret the behaviour of his social environment, will he be able to adapt himself to it, and utilise it in the furtherance of his own aims and purposes. Thus the primitive tendency to regard external things as having an inner being which is the counterpart of our own subjective life, finds in social intercourse a unique field for its development.

With this development of social consciousness a most important group of interests grows up and progressively increases in range and complexity. The child becomes more and more interested in the interest which others take in himself, how they feel toward him, what they think of him, and so on. He looks constantly to his social environment for sympathetic appreciation and sympathetic co-operation ; he fears and shuns disapproval and opposition from it. Besides this, he becomes more and more interested in the psychical life of others and their social relations without any special reference to himself or to his own private ends.

Intersubjective intercourse can only exist in a rudimentary stage before the growth of imitation and of language as the vehicle of ideal construction and ideal communication. After what has been said in the last chapter only brief reference is required to the exceedingly important part played by language. The child can follow up his own trains of ideas only by help of ideas suggested to him through the words of others, and it is only by expressing his own thoughts in language that he can elicit from them the required expression of theirs.

Thus he is always virtually or expressly asking questions and getting answers. The answers are not of his own making; yet they are answers to his own questions. They can only be regarded by him as coming from another mind which is not only thinking of the same things he himself is thinking of, but is also thinking of his thoughts concerning these things. At first his part in this interchange of ideas is mainly passive. But he soon begins to give as well as take. He answers questions as well as asks them, imparts instruction, suggests lines of action, explains difficulties, etc. He thus becomes increasingly aware of others as dependent on him for the development of their trains of thought, just as he is dependent on others.

As regards imitation, the main point to be noted is that we cannot know what it feels like to perform an action except in so far as we have performed more or less similar actions ourselves. Thus in imitating what others do we obtain the means of interpreting their outward behaviour as expressive of their inner experience in the way of cognition, feeling, and emotion. A child sees his nurse throw a ball and attempts to do the same thing himself. So far as he is successful he has lived through the experience connected with the act imitated. Hence, when he again perceives his nurse throwing a ball, her outward behaviour has for him a new significance. He knows what his nurse feels like in throwing a ball, because he has thrown a ball himself.

From the close of the first year imitation plays a progressively larger part in the activity of the child, until a stage is reached in which it pervades almost his whole behaviour. Nearly all childish plays bear this character. A little boy

will push a chair before him as a puff-puff, at the same time puff-puffing himself. He will mimic his father smoking a pipe, or the movements of his mother playing a piano. He will use a playmate as a substitute for a horse, and provide substitutes for whip and reins. He will array tin soldiers against each other for battle. The little girl will dress and undress her doll, feed it, scold it, slap it, fondle it, put it to bed, soothe it to sleep, take it out in a perambulator, and so on. Such imitative activity enables children to enter into and appropriate the experiences of others. A little girl, for example, in fondling or scolding her doll comes to know what it is like to scold or fondle, as she already knows what it is like to be scolded or fondled.

It is not easy to overestimate the importance of imitation as a method by which the individual gains relatively definite and vivid insight into what goes on in the minds of others. But we must never forget that it is only one phase or aspect of a very complex process. Imitation is in the main only significant because of its intimate union with social co-operation in thinking, willing, and acting. Co-operation is essentially different from mere imitation. When *A* socially co-operates with *B*, it is by no means necessary that *A* shall do or attempt to do what *B* is doing. On the contrary, in the more typical and important cases, *A* does or attempts to do something different from what *B* is doing. He acts in a way which is complementary to the act of *B*. He plays not a similar *rôle*, but a corresponding *rôle*.

Now the imitation of children, where it is most important for mental development, has a certain dramatic character. The child in imitating enacts a distinctive part, and presupposes that others are enacting correspondingly distinctive parts in the whole constituted by a certain social situation. Sometimes the part assigned to others is merely that of interested spectators, who are expected to encourage and applaud, or, it may be, to disapprove or forbid. But in most cases more definite co-operation is required. When a baby begins alternately to cover and uncover his own face as he has seen his nurse or mother cover and uncover hers in the game of peep-bo, his behaviour is so far merely imitative.

But he is not content with this. He also expects the mother or nurse to make appropriate noises, and to look duly surprised and pleased at the right points. Thus, in this novel way of playing *peep-bo*, he obtains a new insight into the inner experience of others, not merely as being like his own, but as the necessary complement of his own—as connected with his own in an inseparable unity.

It is significant that children in imitating show a strong tendency to interchange *rôles* with their elders—to do to others what has been previously done to them, to become relatively active in situations where they have in the past been relatively passive. To begin with, it is the nurse who picks up what the child drops or throws down. But as he becomes able to run about and to pick things up himself, he begins to find pleasure in fetching and carrying for others. He will bring back the ball to the nurse in order that she may throw it again. At the dinner table he will hand or carry forks, spoons, apples, and biscuits to his father and mother. In playing with such toys as stuffed animals or tin soldiers, he will assume an attitude of authority, controlling their actions, approving and scolding, and commanding and forbidding, and in general subjecting them to his will as he himself is subjected to the will of his elders. He behaves in the same way toward children younger than himself. In this his social consciousness receives new developments which it could not otherwise acquire. He comes more and more to represent the mental life of others as depending on his own as well as his on theirs.

In the more complex and developed dramatic play of children, the *dramatis personae* are not, as a rule, actually present. They are represented by a process of ideal construction, assisted and sustained by what R. L. Stevenson calls "lay figures" and "stage properties." The doll is a centre of reference, which permanently supports the ideal representation of the life history of a baby, and at the same time supplies that concreteness and vividness which is wanting in the mere idea. The girl, in playing with the doll, treats it ideally, and so far as possible, actually as if it were a baby. She imaginatively places it in varying social situations relatively to herself, and invests it with appropriate emotions,

wants, perceptions, and modes of behaviour, and represents herself as feeling and acting toward it in corresponding ways.

Evidently this free ideal construction of social situations must greatly help to enlarge and deepen social insight. The materials for it are primarily derived from the child's own social experience. But in the constructive process he or she acquires a mastery over these materials in the way of conceptual analysis and synthesis such as could not easily be otherwise attained. Later on the raw material of ideal construction is partly derived from books and similar sources. So far as this is the case, the playful drama gives concrete vividness and detail to ideas which would otherwise be relatively vague and schematic.

Intersubjective Intercourse and Self-consciousness.—The development of social consciousness is inseparably one with the development of self-consciousness. The individual's interpretation of the behaviour of others is ultimately based on his own subjective experience. Hence, in dealing with them he is continually led ideally to analyse and reconstruct his own mental life. Besides this, in every typical social situation he is aware of others in relation to himself and of himself in relation to others.

The conception of self so formed essentially includes relation to other selves. It is a conception of the part played by the self in the co-operative union which constitutes society. In thinking of ourselves we think of the attitude of others toward us and of our attitude toward them, of what we and they think of each other, expect of each other, feel toward each other, etc. Ask any man who he is and he will reply by describing his social position, by referring to his profession, the family to which he belongs, and any deeds or intentions of his which have a social significance. It is in society that we live and move and breathe and have our being. If we disregard all qualifications of the self which presuppose social relations, it is not too much to say that all that constitutes distinctively human self-consciousness disappears.

As the social situation varies, self-consciousness undergoes corresponding transformations. When we are commanding,

instructing, or advising, we are aware of ourselves as relatively superior, as initiating, continuing, and developing trains of ideas and actions in the minds of others. When we are receiving commands, instruction, or advice, we are aware of ourselves as relatively inferior, as having our thoughts and actions determined by the thoughts and actions of others. It is a different self we are conscious of when we are giving protection or consolation and when we are protected or consoled. It is different in the family circle and in the office. It is different according as we are dealing with friends or enemies. The boy's self-consciousness varies according as he is playing with his big brother or his little brother.

The function of imitation in the development of self-consciousness is exceedingly important, especially in its earlier stages. While the imitative endeavour is as yet unfulfilled, the experiences connected with the action to be imitated are as yet beyond the reach of the imitator. They are for him something relatively vague and mysterious. The conception of himself includes a contrast between what he actually is and does and what he is trying to be or do; and this contrast is one between himself and the person to be imitated.

So far as the imitative endeavour becomes successful, the situation is changed in a twofold way. By the same process the individual acquires the power of entering into sympathetic communion with another self, and also in the same act develops and enriches his own self-consciousness. A young child sees his mother throw a ball, and he says, "Baby frow ball." The ball is given to him, and in his fashion he throws it. He again says, "Baby frow ball." But now the words have for him a new significance. "Baby" is a triumphant baby, able to throw balls. He next carries the ball back to his mother and says, "Mamma frow ball." His mother's throwing the ball has now a new interest and significance for him because through his own experience he has come to know better what she feels like when she throws it.

We must, however, remember that imitation is mainly important in connection with social co-operation. The child's consciousness of a triumphant self is largely relative to the

sympathetic interest which it seeks and obtains, or perhaps fails to obtain, from its mother. In this respect those imitations have a peculiar importance in which children interchange the parts previously played by themselves and others, becoming relatively active where they had been relatively passive. In this way the child contemplates its own mental life reflected in that of another self, as it may see its own body reflected in a mirror.

From the end of the second year, or even earlier, children imitatively assume attitudes of authority toward such toys as dolls or stuffed animals. The doll is put to bed and obliged to go to sleep. If it does not go to sleep there are disapproving gutteral noises imitated from the nurse. Later on the naughty doll is put in a corner as punishment. In fact, the little girl treats her doll just as she has been treated herself by those exercising authority over her, and represents it as behaving much as she herself behaves in like circumstances. Thus in imaginatively investing it with a life history she ideally represents her own life history, so to speak, externalised and transferred to another self. She becomes conscious of herself in another. On the other hand, in enacting the rôle of nurse or mother toward this counterpart of herself, she becomes self-conscious in a different way. She becomes conscious of herself as one exercising sway and authority.

Intersubjective Intercourse and the External World.—The development of intersubjective intercourse does not only involve a progressive enlargement and transformation of self-consciousness. The same process is in another aspect a progressive enlargement and transformation of the consciousness of the external world.

We saw that on the perceptual level variations in sense-experience which merely arise in connection with the changing states and positions of the percipient organism, tend to be referred to the embodied self rather than to the external thing in which it is interested. This distinction becomes more precisely defined with the growth of intersubjective intercourse.

The way in which this takes place is easy to understand.

Two persons, *A* and *B*, are in presence of the same external object, *O*. *B* examines *O* from various points of view, walking round it, toward it, and away from it. Again, he turns his eyes from it, or turns his back on it, or gets behind something which intercepts his view of it. Perhaps he puts on a pair of spectacles, or looks at it through a piece of coloured glass. All these movements of *B*'s body are observed by *A*, and *A* knows through the analogy of his own case and through the words and behaviour of *B* that they involve a series of changes in *B*'s experience in relation to *O*. Yet *A* can detect no corresponding variations in *O* itself. Similarly, if *B* goes away altogether, *O* remains unaltered. The changes in *B*'s experience of *O* must come to be regarded by *A* as not involving changes in *O*, but only in its appearance to *B*, including the case of its complete disappearance.

In this manner there arises a sharp distinction between what depends merely on the varying conditions of the perceptual process and of cognitive process in general and what belongs to the nature of the external thing as an independent reality. If we look at the moon through a telescope after looking at it with the naked eye, we do not suppose that the change in the visible appearance is a change in the moon itself. The moon does not really become larger or acquire new features. On the other hand, the details discernible through the telescope and undiscernible with the naked eye are regarded as really belonging to the moon.

The reason of this is that the differences discerned appear under uniform conditions of perception. The conditions of perception, being the same, cannot account for the differences in what is perceived. If the same telescope is turned upon other objects, other features are discernible. Should it happen that similar details are recognisable, whatever the object observed, we examine the instrument to see if it is dirty, or to find some other condition affecting it and not the things viewed through it.

The distinction between what is observed and its appearance to the observer tends to be represented after the analogy of a material thing and its reflection in a mirror, or of an original and the copy of it. The self, as we have shown,

comes to be regarded as forming a continuous unity with the bodily organism. Hence there arises a tendency to confuse presence to consciousness with local presence inside the body.

Now when a man sees a stick raised to strike him and runs away in consequence, evidently the stick itself is not inside him. On the contrary the stick itself is seen to be outside him. What is supposed to be inside him as the immediate object of his perception is a picture, or image, or vicarious representation of the stick. The same view is still more strongly suggested when something beyond the range of perception is present merely "in idea." This analogy of reflection in a mirror, or of original and copy, is fundamentally vicious, involving the literal application of a mere metaphor. It has passed from popular thinking into the writings of philosophers, producing endless confusion in the theory of knowledge.

The point on which we have so far dwelt is the effect of intersubjective intercourse in determining the distinction between what is merely due to the varying conditions of cognitive process and what belongs to the nature of the external object. But there is another and an immensely important way in which social communion yields a test of what is physically real as distinguished from mere appearance. That and that only comes to be regarded as externally real which is equally perceptible to all members of society under like conditions.

The external world is the essential medium of social co-operation. Different minds are enabled to unite in conjoint activity for the fulfilment of a common purpose only in so far as each recognises that the others perceive and think of the same objects as himself. Hence the more extensive and effective intersubjective intercourse becomes, the more pervasive and fixed is the view of external reality as something to which all minds have access in common.

Thus, the individual member of society habitually thinks of the externally real as that which exists or would exist under like conditions for others as well as for himself. What does not exist for others as well as himself, under like conditions of perception, he generally regards as mere appearance, as fancy, illusion, or hallucination. Failure to recognise this test is

usually a symptom of insanity, disqualifying the individual from fulfilling his part in the social order. I see what I take to be a man, but others looking in the same direction do not see anything at all. I infer either that the visual appearance is mere hallucination or at any rate that it is not connected with the presence of an actual external object such as I supposed. If I persist in saying that there is really a man there, my friends will send for a doctor and are likely to end by shutting me up in a lunatic asylum.

This reference to other selves pervades our whole attitude to the external world. When it is not expressly formulated it is always lurking in the background of consciousness as a latent assumption or presupposition. "We are walking, let us say, in a village street, looking idly about from stone heap to passing carriage, gaunt telegraph pole, and gabled house. We are not conscious of any person, yet we vaguely realise that this is a shared, a common, a public experience, not a private one, that the other people, actually or conceivably present, are [or might be] seeing the same sights, house and carriage and stone heap."¹ If any part of the scene specially interests us, we may begin to talk to a by-stander about it, assuming that he has perceived it or can perceive it as well as we ; and we do this without being aware that we are making an assumption at all.

Finally, the development of co-operative thinking and willing gradually gives rise in the history of the race to the mechanical view of nature displacing the primitive anthropomorphism which tends to attribute psychical life more or less determinately like our own to all external things interesting enough to attract special attention.

This transformation is due in the first place to an increasingly sharp and impressive contrast between inanimate and animate things. Bodies which behave in such a manner as to make possible social co-operation, become more and more distinctly marked off from those which do not adapt themselves to the social order. A widening and deepening knowledge of the material world does nothing to verify the anthropomorphic point of view, which endows rocks, trees, streams, cataracts,

¹ "Introduction to Psychology," by Miss Calkins, p. 172.

etc., with a mental life like the human, and capable of being similarly influenced. On the contrary, growing acquaintance with human conditions on the one hand and external nature on the other shows more and more clearly that such things are in no sense in social relation to us, and that to treat them as if they were so, is practically futile and misleading.

It is, above all, progress in the industrial arts which brings about this changed view of the external world. As man's control over his physical environment increases, he comes more and more to regard material things not as having an independent psychical life of their own, but rather as means and instruments for the fulfilment of human purposes. He comes to regard them as relatively passive tools. The clay cannot say to the potter, Why hast thou made me thus? The old anthropomorphism decays, and as it decays it becomes displaced by a new anthropomorphism which is fitted to stand the test of experience. Material things still in a sense appear as manifestations or vehicles of psychical life, but this psychical life is that of the human beings who adapt them to fulfil human ends in the co-operative union of society. A railway train is an expression of thought and will, but the thought and will expressed in it are the thought and will of its inventors and makers, of the capitalists who invest in it, and of the public who use it. This is the way in which we regard it whenever we consult a Bradshaw or take a ticket at a railway station.

To understand the full importance of this point of view we must try to realise in how thorough-going a way civilised society has mastered its material environment and reshaped it for the satisfaction of its own needs. Wherever we turn our eyes, we are constantly confronted with external embodiments of human will and intelligence. We must go to the wild moorland or the lonely mountain side to find mere nature, and even there we do not quite succeed.

In all this re-arrangement and remoulding of the external world, so far as it is efficient, primitive anthropomorphism yields no help except accidentally. All depends on discovering certain rules or laws of interaction which have no reference to an inner psychical life in material things. The point of view

which proves efficient in the long run is the mechanical. In order to succeed, man must concentrate attention on those modes of behaviour of external things which make machinery possible.

This view of external nature arises first in connection with practical contrivances as embodied in tools, utensils, weapons, machines, and similar arrangements. But as it becomes more and more predominant in human thought it receives another application. It is applied theoretically in order to interpret and explain natural processes as they take place independently of human action. The tendency is to regard the external world in general as if it were a mechanism analogous in its working to mechanisms of human construction. Modern science has achieved its successes mainly on these lines. It has made a strenuous effort to interpret even vital processes purely from the mechanical point of view.

What we have said about primitive anthropomorphism and its decay refers to the history of the race. In the case of children also there is discernible at a certain stage of their development an anthropomorphic tendency comparable to that which is common among savages. But the civilised child is from the outset placed in a social environment which discourages and suppresses such modes of thought. Hence they last only for a comparatively brief period, and in some instances their presence is hardly in evidence at all. A little girl of three or four years may cry when she sees a flower plucked because she represents it as feeling pain. Childish grief over a broken toy has often an anthropomorphic element. But some children seem scarcely to pass through the stage at all. They find everybody around them acting and speaking as if plants and inanimate things do not feel what happens to them. Hence they rapidly learn to regard them in the same way. 1

In conclusion, it is necessary to guard against a misconception. We have described the decay of the uncritical anthropomorphism of the savage and of young children. But it must not be supposed that the projection of the self, which is a primary condition of our apprehending the externally real at all, ever entirely disappears, at least from ordinary thinking. On the contrary, it is implied in a modified and

attenuated form, whenever we speak of things as exerting force or offering resistance, as pushing, pulling, or pressing, as in states of strain or tension, or as acting and being acted on. It is implied in our ordinary conception of things as actually existing and persisting with a unity and identity of their own independently of the vicissitudes of our sense-experience.

It is a question for Metaphysics whether this subjective element is capable of being eliminated, and whether it ought ultimately to be eliminated from our view of the external world. The present writer thinks not. To get rid absolutely of what is due to the projection of the self would be to kill the goose that lays the golden eggs.

CHAPTER XV.

EMOTION.

In preceding chapters we have mainly considered the development of cognition. We have indeed never lost sight of the concrete unity of mental life as involving an inseparable connection of conation, feeling-attitude, and intellection. None the less our treatment has been one-sided. For we have referred to interest mainly as a factor in the processes of perceptual adaptation and ideal construction. We have not expressly discussed the way in which the various forms of interest themselves become differentiated and organised.

It is now time to take up this problem. We have in what follows to deal with the same concrete process of development which has hitherto occupied us. But we have to deal with it from a different point of view. We have now to regard the growth and differentiation of cognitive apprehension merely as a factor in the growth and differentiation of conation and feeling-attitude, instead of regarding interest as merely a condition of the development of cognition. Our first step will be to consider the special emotions and the conditions under which we become capable of feeling them. For it is the endless diversity of emotional states which gives its variety to our subjective life, playing in it a part analogous to that played by sense-presentation in cognitive process.

General Nature of the Emotions.—Every distinctive type of emotion has its own peculiar quality which is incapable of being further analysed. In order to know what anger is we must feel anger ourselves, just as we can only know what the sensations of red or blue are by ourselves experiencing them.

This does not imply that emotions are absolutely simple states which do not at all admit of analytic description. It implies only that they can never be resolved without remainder into a combination of more elementary constituents, otherwise known outside this combination. An emotion may include within its unity a complex of emotional states as its components. But it can never be simply equated to these ingredients which enter its composition. It includes them, but it is not simply identical with them. Jealousy may include in intimate union anger, wounded vanity, grief, tender reproach, and a variety of other emotional ingredients otherwise known than in this combination. But all these taken together do not of themselves make up the peculiar experience of being jealous. They no more do so than the taste of sugar and the taste of coffee make up the peculiar taste of sweetened coffee. The blend in both cases has a distinctive quality of its own.

The first general character of the various kinds of emotion which we have to note is that however composite they may be they each contain as unifying centre of the complex a unique and irreducible element.

In the next place, it must never be forgotten that emotions are subjective attitudes toward an object. To be angry is to be angry with something or somebody, to be grieved is to be grieved over something, to fear is to fear something, to be joyful is to rejoice concerning something. The object may be vague and indeterminate. But there is always a tendency to specialise it. The emotion tends to define itself by fastening on determinate objects.

A person in a bad temper will find special occasions for feeling cross, angry, or fretful in occurrences which would not have affected him at all or would have affected him agreeably in a more complacent mood. Joy, however it may arise in the first instance, involves a predisposition to be pleased with things which would otherwise have left us indifferent or perhaps annoyed us. The jealous person finds food for his jealousy in all kinds of circumstances which would not have excited such an emotion had it not previously existed. To be in a hopeful mood is to look on the bright side of things, and

to be in a despondent mood is to look on the dark side of things. The same emotion may in this way transfer itself successively from one object to another. The servant who resents being scolded by her mistress is apt to vent her ill humour on her own subordinates. We are often cross with one person, *A*, simply because we have been vexed by another, *B*.

Finally, the typical varieties of emotion are each connected with certain characteristic directions of conation—trends of activity. Anger involves a tendency to destroy and forcibly to break down opposition.

Joy involves what we may call expansive activity. It brings a heightened zest for such movements of attention and modes of behaviour as are not intrinsically painful and do not involve strain and effort. Thus it is characterised by a playful attitude. Attention is spontaneous rather than voluntary. It is not persistently concentrated in a restricted channel so as to attain some ultimate end. On the contrary, it plays round objects which are directly agreeable, leaving them as soon as they cease to be attractive. External behaviour shows comparatively little practical adjustment. Movement in general is quick and vigorous. Laughter, clapping of hands, jumping up and down, singing and whistling are characteristic expressions. There is a tendency to social demonstrativeness and generosity. A man in joyful mood may go out of his way to give sixpence to a beggar, who could not have extracted a penny from him had he been sorry or angry.

Anger and joy have been called “sthenic emotions”¹ because they are accompanied by a general heightening of activity—in the case of anger, activity against opposition, in the case of joy, relatively free and unimpeded activity.

Grief and fear, on the other hand, are asthenic. In them, bodily and mental action is on the whole abated or repressed. In grief there is a tendency to dwell with monotonous persistence on its own appropriate objects, loss and misfortune. Activity in other directions becomes relatively enfeebled and costs more or less effort. We speak of a person being *plunged*

¹ From *σθένος*, strength.

in grief and of attempting to *rouse* him from it. In grief there is general depression and disturbance of the vital functions, accompanied by cries, complaints, and movements which give relief by drawing off nervous energy, instead of specific motor attitudes in the way of practical adjustment to surrounding conditions. This absence of practical adjustment is connected with the nature of the object of the emotion, which is in general a loss or misfortune regarded as beyond remedy. It is spilt milk over which we cry.

Fear, on the contrary, arises in a situation which demands action for averting, evading, or escaping a loss or misfortune which has not yet taken place. But, at the same time, the situation is of such a nature as to disable and disconcert either by its strangeness or by the threat of approaching evil. In extreme cases all activity is paralysed except that of absorbed attention to the object feared. This is what is called the fascination of fear. In general, however, there is practical adjustment in the way of flight or hiding and the like, and perhaps even in the way of active opposition. But the emotion of fear in proportion to its intensity impairs the efficiency of the actions which it prompts, and so destroys "presence of mind." It is the intrepid person who is best able to face danger.

Emotion and Organic Sensation. James's Theory.—It is a well-known fact of ordinary experience that emotions, at least when they pass a certain degree of intensity, are accompanied by characteristic bodily changes, in part obvious to the external spectator, in part taking place in the internal organs. There is a play of facial gesture, varying tension and relaxation of the muscles, increase or abatement of the secretions, changes in respiration, heart-beat, and circulation of the blood. These variations in the state of the body give rise to corresponding varieties of organic sensations, which in their turn form ingredients in the emotional experience. The nervous excitement correlated with emotion plays on the organism in general as on a sounding-board, and is in its turn modified by this organic resonance.

Experimental research has traced with some fullness and

exactness the nature of the changes in the internal organs connected with the special emotions, and has shown that such changes take place even when there is no manifestation of them obvious to the looker-on. Such facts as these have suggested to certain psychologists, among whom Professor James is most prominent, a theory according to which emotion simply consists in organic and kinaesthetic sensations. On this view, the nervous excitement immediately connected with the receipt of good or bad news is not correlated with any emotion of joy or grief. The emotion arises by a kind of back-stroke. The primary nervous excitement must first overflow through efferent nerves, producing changes in the internal organs which in their turn give rise to organic sensations. It is the organic sensations thus produced which constitute the emotion. This is James's theory.

It is undoubtedly true that our experience of the sensation of the visceral and vasomotor changes which accompany the emotion form an important constituent of our total state of mind when we are afraid or when we are glad. The unpleasant feeling tone which we experience after the perception of a dangerous object is largely the feeling tone of these visceral concomitants of the emotion of fear. There are unpleasant sensations from the skin which result from the driving of the blood from its surface through the contraction of its capillary blood-vessels, and there is a peculiarly unpleasant "sinking feeling" vaguely localised about the stomach which results from a similar driving of blood from the internal organs.

If these were absent from our reaction to a danger situation, then our total state of mind would be very different. The experience of being afraid would also be much less unpleasant than it is in fact. So much must be conceded to the physiological theory of the emotions. That is not, however, the same thing as saying that the sensation of these changes is the emotion of fear.

This theory is open to obvious objections which seem to justify a refusal to accept it in the absence of very strong and unequivocal evidence in its favour. In the first place, it seems to leave no room for a psychical change correlated

with the primary nervous excitement which by its overflow gives rise to the diffused organic disturbance. The shock of bad news stops the beating of my heart. It seems inconsistent with the general principles of psychophysical parallelism to suppose that this shock is unfelt before the bodily changes occur which result from it. But if it is felt, how can it be felt otherwise than as an emotion? How can its intensity be anything but emotional intensity?

Further, it is very hard to assign any characters sufficient to mark off the organic sensations which are supposed to constitute emotion from others. Hunger, thirst, headache, the diffused discomfort of a fever or a cold, are not emotions. What, then, is the distinctive peculiarity of the organic changes which produce emotional consciousness? The theory offers no adequate explanation. Even those organic sensations which admittedly enter into and colour a total emotional state are apprehended merely as sense-presentation when they are separately attended to. Cold shivers and warm tinglings are recognised as cold shivers and warm tinglings, not as feeling-attitudes of the subject toward an object. It would seem that organic sensations assume an emotional character only by being fused with an emotion which must be supposed to have a relatively independent existence.

In the third place, the results of the most recent and exact experimental research seem distinctly unfavourable to the theory. The connection between the various types of emotion and distinctive bodily changes turns out to be neither so simple nor so uniform as the theory requires.

In favour of the theory an appeal is made to a sort of introspective experiment. It is alleged that if we abstract resolutely from concomitant organic changes and the connected sensations, we find that the emotion itself disappears from our view. There seems to be nothing left which we can call an emotion. This statement may, perhaps, be reasonably doubted. But even if we admit its truth, it does not prove what it is intended to prove. It may be essential to an emotion that it should find expression. It may be that we cannot suppose the expression to be absent and at the same time suppose the emotion to continue in existence. But it

by no means follows that the emotion is to be simply identified with what we call its expression and the resulting organic sensation.

Emphasis is also laid on our power to control emotion by suppressing its external manifestations. This is undoubtedly possible to a certain extent. But the fact can be easily accounted for without assuming the theory. We may directly suppress or "damp down" the emotional excitement by denying it its appropriate outlet. Further, the man who is attempting to refrain from the external manifestations of emotion has already some control over it. He is no longer merely its slave; his mind is already influenced by other motives which tend to check it. Finally, in the effort to modify his external behaviour, his attention and his nervous energy are diverted into new channels, and in this way the emotional excitement is abated.

We cannot then accept James's theory. And we may now add that even if we did accept it, its significance would be more physiological than psychological. It would not really mean that emotion is a kind of sensation. It would only mean that emotions are conditioned in their occurrence as sensations are conditioned, *i.e.* by excitation travelling along afferent nerves. An emotion is a feeling-attitude of the subject toward an object; a sensation is nothing of the kind. This distinction cannot be affected by any theory of the mode in which emotions are produced. From the inner point of view of the subject who experiences emotion, it remains radically different from sensory presentation, whether James's theory be true or false. But it is precisely this inner point of view which is important to the psychologist in contrast to the physiologist.

Emotions as Primary and Derivative.—When our capacity for feeling an emotion depends on our having previously felt other emotions, or at least on our having acquired the capacity of feeling them, the emotion may be called derivative. The other emotions on which it depends are relatively primary. The pity which a man feels for the grief or for the impotent anger of another may be such as he could not feel if he had

not gone through analogous experiences himself. To this extent his emotion of pity is derivative. It is based on his own previous emotions of grief or impotent anger.

This does not necessarily imply that the previous emotions are sympathetically reawakened in himself when he pities the person who is now feeling them. They may be so reawakened in a greater or less degree. But such ingredients may also be absent or hardly discernible in his emotion of pity. All that is necessary is that his previous emotions of grief or impotent anger should have left behind them mental dispositions capable of modifying his emotional experience in the future and in particular rendering him susceptible of a certain kind of pity which he could not otherwise have felt.

The word "derivative," then, does not necessarily imply complexity. It does not necessarily imply that the relatively primary types of emotion enter as ingredients into the composition of the emotion which presupposes them as its conditions. For the most part the primary emotions do recur, often very faintly and obscurely, in the derivative emotion. But it would lead to needless difficulties to suppose that this is always the case.

Anger, fear, grief, joy, and surprise, in their rudimentary forms, seem to be absolutely primary. They do not presuppose other emotional experiences as their conditions or components. On the other hand, admiration, gratitude, remorse, and wounded vanity are examples of derivative emotions.

There is evidently a wide field for psychological work in tracing the genetic connection of derivative emotions with those which are relatively primary. Unfortunately, however, little of importance has been actually accomplished in this direction. The earlier psychologists mainly content themselves with attempts to define, classify, and describe various types of emotion as if they were so many specimens in a museum. This line of treatment is utterly inadequate to do justice to the *fluency* of our emotional life, to the mode in which "the internal shadings of emotional feeling merge endlessly into each other."¹ To quote Professor James, "The merely

¹ James's "Principles of Psychology," Vol. II., p. 448.

descriptive literature of the emotions is one of the most tedious parts of psychology. You feel that its subdivisions are either fictitious or unimportant . . . They give nowhere a central point of view or a deductive or generative principle; but unfortunately there has been little psychological writing about the emotions which is not merely descriptive." In place of any such descriptive classification, for which he had little use, James gave his own famous contribution, which has been criticised above. The general dissatisfaction expressed by James was shared by other writers, with the result that more recently there has been a tendency, in work on what professed to be the psychology of emotion at the human level, to deal very perfunctorily with the psychology of the emotions and to substitute for this a discussion of their physiological concomitants and conditions; and in fact James' theory lent support to this tendency.¹

¹ The following chapter must be regarded as supplementary to Professor Stout's discussion in the chapter which immediately precedes.
—S.H.M.

CHAPTER XVI.

PROBLEMS IN THE PSYCHOLOGY OF EMOTION.

BY S. H. MELLONE.

Complexity of Emotion.—In connection with the treatment of feelings at different levels of mental life—internal sensation, external sensation, perception, ideation—some writers seem to fall into the logical error of putting forward a statement about the meaning of an abstract term as if it were a statement about concrete facts. For example: it has been said that “there is no qualitative difference discoverable between the pleasantness of a colour and that of a successfully concluded argument, when careful abstraction is made of the very wide differences in all the attendant circumstances”; or, to the same effect, “When I have pain in my teeth or my finger or my stomach, when I lose my wife, my friend, or my situation, if in all these cases we distinguish what is pain and pain alone and is not to be confused with sensation, idea, or thought, we shall recognise that this special element is identical in all the cases.”¹ But to say that there is no difference in kind, for example, between the pain of a great grief and the pain of toothache, is only to say that the abstract term, pain, means the same thing in the two cases; in fact, it is only to say that the abstract term has a definite and fixed meaning—that “pain is pain.” But the *abstractions*, pleasure, pain, do not exist. The pleasures and pains which do exist have special characteristics due to the psychological and physiological context in which each occurs.

Alice in Wonderland met with a cat whose face invariably wore a “grin”; and this cat was liable to vanish suddenly. On one occasion, however, the cat vanished quite slowly,

¹ Ribot, *Psychology of the Emotions*, Eng. tr., p. 42.

beginning with the end of the tail, and ending with the "grin," which remained some time after all the rest of the cat had gone. What is possible in Lewis Carroll's "Wonderland" is not possible in any other world. In the world of mental life, a pleasure or a pain can be distinguished from its context, but when so distinguished it has no separate existence, any more than in the physical world a "grin" exists abstracted from a "cat." Hence—to return to our previous illustrations—the "pain of a toothache" and the "pain of a great grief," or the "pleasantness of a colour and that of a successfully concluded argument" do really differ in mental quality, because the "very wide differences in all the attendant circumstances" do really make a difference in the pain or in the pleasure, as the case may be.

Professor Stout's observations in the preceding chapter suggest that when we attend to the concrete facts, we find that emotion normally has a complex structure, in which the following bodily and mental factors can be distinguished:

On the Mental Side:

- (a) the perception (or imagination or memory) of a situation in which the individual finds himself, and which affects his material, mental, social, or higher interests;
- (b) an affective quality, tending towards pleasure or towards pain;
- (c) a tendency to activity;
- (d) a complication of organic sensations.

On the Bodily side:

- (e) diffused internal changes, cp. (d) above;
- (f) muscular movements, cp. (c) above.

In describing any emotion, the following points should therefore be attended to:

(1) The nature of its object (the kind of situation which when perceived, remembered, or imagined, arouses it).

(2) Its effective quality: pleasant, painful, or as an excitement which is not definitely pleasant or painful. William

James observed that "there are endless shades and tones in the various emotional excitements which are as distinct as shades of colour are, and of which one is quite at a loss to predicate either pleasurable or painful quality."

(3) Its massiveness or volume: this depends on the factors (b) and (d) above.

(4) Its bodily expression: in psychology this is understood to mean all the bodily changes which occur in connection with the emotion; facial expression is only one part of it, and concerns the facial muscles alone.

(5) Its mode of influencing the will, depending on the factors (c) and (f) above.

(6) Different modifications of the emotion (if any) which occur at different levels of mental development.

An emotion of the same type may occur at any level of experience, from the most elementary forms of perceptual consciousness to the highest forms of ideational and conceptual activity; and corresponding to this wide mental range (as we may call it) of the emotion is the varied nature of the conditions which may arouse it: *any kind* of danger may excite *fear*. An emotion is not a mere response to a sense stimulus, as a reflex may be, nor to a particular object, as an innate propensity may be. It is a general *kind* of situation, not a specific class of objects, which excites a certain kind of emotion.¹

William James' theory, that the distinctive nature of the emotional consciousness consists in sensations arising from the internal organs of the body, including both viscera and muscles, was not the novelty that it was sometimes supposed to be. An essentially similar doctrine had been elaborated by Malebranche and Descartes in the seventeenth century. What was novel was the vigorous, enthusiastic, and eloquent advocacy of the doctrine by William James. Forty years before the period of James' work, the German psychologist and philosopher Lotze had pointed out the importance of these bodily concomitants of emotion, and in so doing had

¹ Stout, *Manual of Psychology*, 5th ed., pp. 362-363.

not transcended the bounds of common sense: "A contracted position of the body damps our ardour; in a listless attitude, we cannot feel aggressive; anger subsides with the subsiding of the bodily tension; even the higher emotions connected with the appreciation of the beautiful and the good are compounded with [Lotze does not say *compounded of*] freer breathing, quickened pulses, and increased sense of vitality, while repentance and sorrow are not mere judgments of moral failure, but also actual conditions of physical depression, shown in relaxation of the limbs, reduction of the breath, and a general sense of organic oppression."¹

James' original statements, in his *Principles of Psychology* (Vol. II., Chap. XXV.) appeared to suggest sometimes one and sometimes the other of two divergent views, especially in reference to the so-called "stronger" emotions, such as anger, fear, joy, grief, shame, pride, in which the organic reactions are comparatively vigorous. The two views may fairly be stated thus. (1) The bodily feelings follow directly *the perception of the exciting situation*, and our feeling of the same changes as they occur is the emotion. Here the emotion, though constituted by its bodily symptoms, is made to depend on ideation, and cannot occur until this occurs. (2) The immediate cause of the emotion is a physical effect on the nerves. This, said James, is most clearly seen in those pathological cases in which the emotion is objectless, where it is nothing but the feeling of a purely bodily state and has a purely bodily cause. On this, it must be pointed out that for "objectless" we should say "groundless," because in such pathological cases the organic sensations work on the imagination, which tends to create an object.

The first of these two views is the one which James, in response to criticisms, developed and declared to be his own. All the critics concurred in indicating a serious gap in the statement of it. How comes it that the perception or idea excites the organic discharges on which the emotion, as feeling, depends? Surely it can only have been because the perception itself becomes the basis of an emotional state,

¹ Lotze, *Medizinische Psychologie*, quoted by Spearman, *Psychology down the Ages*, Vol. II., p. 332.

without the intervention of the bodily symptoms. If I experience the physical symptoms of fear on seeing a certain animal, it is not the perception itself, the "cold and neutral intellectual state" that initiates these symptoms which in their turn produce the emotional feeling. There is nothing in the mere perception of a bear, as such, to produce symptoms of fear; it is because the perception suggests possibilities—it arouses ideas which, integrated with it, form the representation of a total situation viewed in its relation to myself, and this representation arouses the emotion. The total situation may be that of the bear attacking me or someone else; or, if the bear is tame or caged, the total situation is quite different; but, whatever it is, the emotion depends upon it, and the bodily "expression" is different according as the emotion is different.¹ The specific factors of the emotion may be innate or acquired as regards *what* they are; but *that* they are, is due to the whole mental state called the emotion. James agreed that "as soon as an object has become familiar and suggestive its emotional consequences must start rather from the total situation which it suggests than from its naked presence; but whatever our reaction on the situation, it is always an instinctive reaction on that one of its elements which strikes us as most vitally important." But *why* does this element strike us as vitally important? What is the source of its valuation? Does it strike us, *prior* to the instinctive reaction, as vitally important? Then most certainly it already has emotional worth. James, however, still found himself unable to admit this. He continued to maintain that the emotional excitement which follows the idea, follows it only secondarily and as a consequence of the diffusive wave of impulses aroused.

Surely it is most paradoxical to maintain that the whole of the distinctively emotional factor in the mental experience consists only of a passive reception of internal bodily sensations. From this side, James Ward, after pointing out that the appeal to pathology "is futile in fact and false in method," and that in tracing the genesis of mental processes we must interpret the abnormal by the normal, not the normal by

¹ The discussion here referred to will be found in the "Psychological Review" (U.S.A.), Vol. I., No. 5.

the abnormal, concluded as follows: "Emotion is *always* the expression of feeling, and feeling, for the subject who feels, has *always* an objective ground. Emotion is *never* the mere reception of impressions, but is *always* the response to them. The response consists normally in a two-fold, more or less diffuse, excitation, which (a) alters respiration, circulation, and other vegetal processes, and (b) braces or relaxes various voluntary muscles, in ways characteristic respectively of such different emotions as anger and terror. James' theory did nothing to show that the organic components of the emotional "expression" are not as truly centrally initiated and subjectively determined as the motor components.¹

Throughout the present work, the position is taken that mental life is not a mere redistribution of "units" or "elements" of any kind or of material already given, but a continuous process of growth from within. In growth, the "old" is related to the "new" so intimately that it has become customary to speak of the later qualities as developing "from" or "out of" the earlier ones; but the scientific value of this statement depends on what exactly is meant by "from" or "out of." Evolution consists in the continual emergence of qualities which are not only apparently but really *new*; and when we say that a specific quality (call it "B") has evolved or developed "from" another ("A"), all that we can mean, logically or scientifically, is that "A" must have preceded in order that "B" may emerge. In studying the development of any distinctive factor of mental life—the production of the special sensations from a common sensibility, or of the fundamental types of thought from an undifferentiated awareness, or of the types of will from a blind conation, or of "derived" from "primary" emotions—we are studying the characteristics of mental processes as gradually more complex forms emerge. The more complex process is not a mere sum of its simpler "constituents" (so called), which may or may not be partially traceable in it; but in the process of the interaction of these "constituents" its distinctive quality is evolved. This is essentially the

¹ James Ward, *Psychological Principles*, Second Edition, p. 275.

view suggested by Professor Stout when speaking of "primary" and "derivative" emotions (see above, p. 174). A distinguished psychologist of the last century stated a similar view as follows: "When two simultaneous feelings combine, they produce a *total feeling* which possess a unitary character, and cannot be regarded simply as sum of the original particular feelings. . . . When opposing feelings alternate with one another in rapid succession there is a continuous modification of one effective phase by the other, so that a new feeling with a characteristic quality of its own arises alongside of the primary changing feelings. Its quality is, of course, dependent on those of the particular feelings, but it cannot be analysed into them. We have an example of this in the field of elementary aesthetic feelings, in the dissonance of two tones. . . . Similar total feelings with accompanying particular feelings constitute the higher intellectual, aesthetic, and moral emotions. . . . Nothing can be more erroneous than the opinion sometimes held, that the entire realm of the emotional life is composed of a certain sum of elementary processes—perhaps sense-feelings—of approximately constant quality."¹ The author adds that the essential characteristic of the life of feeling, especially in the case of the higher emotions, is an inexhaustible wealth of new qualities.

Differentiation and Transformation of Emotion.—This general view of mental development is presupposed in what Professor Stout has described as the "differentiation and transformation of emotion" as conditioned by advance in intellectual growth. This may be illustrated in the case of *anger*. The emotion of anger is characterised by a tendency to break down opposition, whether the opposition consists in the direct infliction of pain or injury, or in hindrances being put in our way or difficulties made—real or imaginary. The characteristic attitude of anger is active resistance or aggression, while that of fear is flight or helplessness; and, like fear, it may be manifested at every stage of mental development, modified or even transformed by the growth of the

¹ Wundt, *Lectures on Human and Animal Psychology*, Eng. tr., pp. 219-221.

fundamental functions of mind. When the cognitive processes are in an elementary state, anger appears as an impulse to break or destroy anything that comes to hand. This has been noticed among gregarious animals—for example, if a herd of cattle are enraged by the sight of a companion in distress, they are as likely as not to vent their rage on the unfortunate victim himself, if nothing else catches their attention. In the same way, when one of a group of dogs utters a howl or cry for no apparent cause, the others, angry at his distress, have been known to turn and attack each other when there is nothing else to attack.

At higher stages of mental life, the opposition which is the real object of the emotion may take more complicated forms; and the development of ideation enables the characteristic activities of anger to be concentrated on its actual existing cause. Professor Stout has thus stated the various forms of this emotion in their relation to mental development. "Anger initially manifests itself by a peculiar form of violent motor discharge. Even at the outset it takes the form of an effort to overcome resistance by main force. The young child who has acquired no definite mode of wreaking his passion, shows it by vague kicking and struggling, by movements which antagonise each other and encounter resistance in external objects. The development of cognitive consciousness restricts this diffused mobility within more definite channels. The child in a later stage throws his plaything to the ground or pushes it away or breaks it, or in the case of a person who thwarts his will he kicks or strikes. . . . In the case of the adult, inasmuch as his anger has become enlightened and defined, his destructive impulse will become more specially directed against the object by which his desires are crossed or thwarted. But when the conditions deny him this satisfaction, it is well known that the angry man is apt to wreak his anger on inoffensive things or persons, thus approximating to the condition of the child. Though the tendency to overcome resistance by violent exertion of bodily force seems always to play some part in anger, yet with the advance of intellectual development it gives place more and more to an ideal satisfaction; it becomes enough to know, or sometimes even to

imagine, that the opposing forces have been crushed by our agency. This is, of course, a consequence of the growing importance of the life of ideas as compared with that of perception.¹

In addition to the aggressive movements in the expression of anger, the muscles of the jaws and eye-brows are set in a way which seems an "organic reminiscence" of the utility (in past ages) of clear vision with the protection of the eyes, and of biting. This supposition is in accord with Darwin's view that anger and kindred passions originated aeons ago in the predatory habits of the race, taken in connection with those of the lower animals, as a result of the early struggles for existence. He regarded anger, retaliation, revenge, and all the ways of giving expression to them (so significant of their animal origin), as a heritage from the past. Whether fully satisfactory or not, this does to some extent account for the "wolf in man."

The earlier British moralists, in the course of their studies of the psychology of the emotions, endeavoured to investigate the *utility* of anger, when we regard man as he is, and his present circumstances as they are. They argued that (given man as he is and his present conditions) anger ministers both to the self-preservation of the individual against hurt or harm, and to the good of the community. When the cause of the harm is another living person it is a warning to him to desist: fully displayed, for example, in the Scottish Thistle, with the significant motto *nemo me impune lacessit*. But when these moralists dwelt on the utility of anger, they did so with a very important qualification. Thus, Bishop Butler, in the eighth of his "Sermons on Human Nature," dealt with anger or "resentment," which, he maintained, "is in itself and in its original no more than indignation against injury and wickedness and, as such, not only innocent but a generous movement of the human mind." "It seems in us plainly connected with our sense of virtue and vice, of moral good and evil." "This indignation raised by cruelty and injustice, and the desire of having it punished, is by no means malice:

¹ Stout, *Analytic Psychology*, Vol. II., pp. 96-97; and *Manual of Psychology*, Fifth Edition, p. 364.

it is resentment against injury and wickedness; it is one of the common bonds by which society is held together—a fellow-feeling which each individual has on behalf of the whole species as well as himself." All this is true even when the injury is suffered by others; but "when it is done against ourselves, or those whom we consider as ourselves, the way in which we should be affected would be the same in kind, but in a higher degree, because the sense of our own happiness or misery is intimately and always present to us." Here the emotion of anger is transformed not only by the "growing importance of the life of ideas as compared with perception" (to which Professor Stout referred in the passage quoted above), but by the influence of moral ideas, issuing in the end in a demand for Justice. The impulse to mere violence passes into the background. In this sense Butler maintained that the emotion of anger is natural to mankind. It becomes profoundly evil only when it is allowed to break its natural bounds and take the form malice, hatred, and revenge. Hate, which Butler did not discuss, is the *emotional disposition* arising from anger: a settled attitude of mind and will, issuing in a desire to injure or make an end of the object hated—cherishing ill-will, and able to bide its time and plan means for the injury or destruction of its object. As hate grows, it becomes a passion whose energy is blindly concentrated on the one purpose. Shakespeare, who illustrated most things in human life, did not overlook this. For Iago, "I hate the Moor" is enough; it becomes a passion whose working plunges himself and all involved, into irretrievable ruin.

The Emotion of Fear.—The psychology of fear presents some problems of special difficulty which are not solved by analysing its bodily symptoms into visceral and other internal sensations.

The object of the emotion of fear (that is, its exciting cause, to which it has reference) is a situation in which we find ourselves and which is perceived or imagined to be one of impending or imminent evil or disaster—a situation which presents an imperative demand for practical adjustment in view of an emergency, together with more or less of felt

incapacity to deal with the situation effectively. There is first of all a mental process—the perception or idea of ourselves in this situation. The volitional energy is concentrated in the muscular movements and in an intense occupation of the thoughts with the dreaded situation—that is, on the perceived objects and the allied ideational trains. We are affected with a massive discomfort, due to a combination of abnormal internal depression and abnormal excitement. Other purely mental pains supervene owing to the conflict of these elements of thought, volition, and feeling. When the cognitive processes are in an elementary state, because they are undeveloped, as in the animal, the "savage," or the normal child, or because they are suppressed as in some wild passion or fear, such as rarely occurs, the bodily manifestations of the emotion may be of overwhelming force. Darwin gave a very vivid description of these in his book *The Expression of the Emotions* (Chap. XII.); and he suggested that the reactions of fear, consciously adopted in some previous and distant generation, have been transmitted as acquired habits from generation to generation until the structure of the animal has been so modified that the activities are compulsory and invariable, but not all (or not at all) useful in present circumstances; but in the end he found the explanation insufficient. The bodily symptoms of fear have no reference to evolution; the trembling of the body, for instance, in fear, is similar to the trembling which occurs when lifting a heavy weight, or when exhausted by illness; the nervous excitement prevents us from co-ordinating the movements of the many muscles involved in every action (even the simplest), as standing, walking, speaking, and so forth. A man who is afraid does not see better, however widely he may open his eyes; he does not hear better; he is the less prepared for action the greater his terror and therefore presumably his danger. Actions which are so injurious to the organism should have disappeared in the course of evolution; but in fear the action becomes more hurtful to the individual the greater the actual danger is. It has been suggested, therefore, that they are not products of evolution, but pathological forms taken by normal processes under abnormal conditions.

In modern civilisations, apart from war conditions, we are less liable to physical fear and more so to intellectual and spiritual fear. Consider the case of "worry." In its more extreme forms, attention is held only by those sensations or percepts, those memories, images, and thoughts which harmonise with or strengthen the emotion; a morbid mental system is formed, by which the tone and tendency of thought, even the whole outlook on life, is modified. Dangers, difficulties, evil consequences, uncertainties, come constantly before the mind, so that the individual does not *act* at all, or acts on any impulse that happens at a given moment to have some strength.

Emotion and its Objects.—In his work on *Analytic Psychology*, Professor Stout argued with great force that conscious process is in every moment directed to some end, whether this end be distinctly or vaguely recognised by the conscious subject or not recognised at all. For mental activity in this wide sense the convenient term "conation" is used. We should therefore expect to find that conative processes and cognitive processes form an inseparable union in the development of mental life; and this is what we do find.

The special emotions supply conspicuous examples. The ideas and combinations of ideas which arise in a mind under the influence of strong emotion are all such as in some manner harmonise with the dominant tendency; they explain it, justify it, or gratify it. Defoe describes in a very vivid and natural manner the state of Crusoe's mind after seeing the print of a man's naked foot on the shore: "I came home to my fortification, not feeling, as we say, the ground I went on, but terrified to the last degree; looking behind me at every two or three steps, mistaking every bush and tree, and fancying every stump at a distance to be a man. Nor is it possible to describe how many various shapes my affrighted imagination represented things to me in, how many wild ideas were found every moment in my fancy, and what strange unaccountable whimsies came into my thoughts by the way." On the other hand, after discovering the remains of a cannibal feast, his emotional attitude becomes transformed from fear to violent indignation,

and this change is accompanied by a corresponding change in the current of his ideas: "But my invention now ran quite another way; for, night and day, I could think of nothing but how I might destroy some of these monsters in the cruel, bloody entertainment, and if possible save the victim they should bring hither to destroy."¹ In Crusoe's case, the first inrush of fear and anger arose in connection with definite objects, but such emotions not infrequently occur merely through general organic conditions without any particular occasion. In such cases, as we previously observed, the emotion finds or makes objects for itself, without any objective "cue" to start from.

Many years ago, the late A. F. Shand, who had devoted himself to these subjects with a considerable measure of success, and whose work does not deserve to be forgotten,² made a special study of the tendencies of emotions and sentiments as factors in the formation of character, starting from the fundamental principle that mental activity tends, at first unconsciously, afterwards consciously, to produce and sustain "system and organisation." Emotion shares the nature of all mental life in having an impulse and an end, in relation to which other mental constituents tend to become organised. An emotion is therefore (in Shand's terminology) a *system* which may contain innate "instinctive" or other active tendencies: "as there are in the body certain greater systems and certain lesser systems, so there are such also in the character; and as in the body the greater systems include certain subsidiary organs or systems, as the sympathetic, the peripheral, and the central nervous system, so in the character also there are certain principal systems which organise others subsidiary to them." Shand finds the unity of an emotional system in the *end* to which all the impulses of the system converge, and which organises the system and gives it its unity and definite character. Under the need of satisfying its end, the emotion will draw into its service any available form of "instinctive" (*i.e.* innate) reaction, and these, however

¹ Quoted in Stout, *Analytic Psychology*, Vol. II., pp. 104-105.

² Shand, *Foundations of Character*, Second Edition, 1920.

varied, will all belong to the same system since they are directed to the same end. These innate reactions, organised within the emotion, are merely innate sensori-motor dispositions to certain bodily movements. A transformation of the *end* may therefore change the character of the emotion itself. We have illustrated this in the case of *anger*. Ultimately what happens in such cases is that the emotion is subdued to one of the great sentiments, like disinterested benevolence, friendship, or patriotism.

Mr. Shand offers the following "tests" which we may apply "to determine whether or not a given emotion is primary, and whether the force which it has belongs to its own system or is derived from any other." (1) The period at which the expression and behaviour of the emotion are first observed in child-life; for although some emotions are primary which arise at a later period, such as the organic impulse of sex, yet when an emotion is manifested in the first months of child-life, that is evidence of its primary nature. (2) The diffusion of the emotion in the animal world; the more widely diffused, the more probable is it that the emotion is primary. (3) Whether we can, by analysis, reduce it to other emotions. (4) Whether the emotion *in its earliest forms* is aroused by sensory stimuli and expressed in sensori-motor reactions. Without attempting any complete list, we find at least six "primary" emotions, each with a distinctive character of its own: fear, anger, disgust, curiosity, sorrow, and joy. Primary in the same sense are certain "appetites" (*i.e.* organic impulses), among which hunger and sex are conspicuous, and certain organic needs, in particular, the need of exercise and the need of rest.

Mr. Shand's exposition of the ways in which emotional systems are expanded into larger systems and organised into types of Character is of much psychological and ethical interest; but discussion of it is beyond the limits of this book, except as regards the vital importance of psychological "sentiments" in the technical sense of this term, and the distinction of "sentiment" and "emotion." This is dealt with in the following chapter; but we add a brief summary here for convenience of reference. The *emotion* is the state of mind

as it is consciously felt; the *sentiment* is the emotional disposition out of which it arises. The simpler forms of sentiment produce only one kind of emotion; in its more developed forms the same sentiment can produce many different emotions. It is a psychological disposition (see above, p. 8) towards a certain object; and it expresses itself in different ways according to the relations into which that object may enter; hence (1) it cannot be felt all at once, and (2) it requires the development of ideation. Thus, *friendship* is a highly developed sentiment. It is a general susceptibility to manifold kinds of emotion varying with circumstances; it is manifested in the *sorrow* at parting with a friend, the *joy* of meeting him after prolonged separation, *hope* for his success, *fear* when he is in danger, *anger* against his enemies. Friendship is an example of an acquired disposition. In ordinary language, the words "love" and "hate" stand for acquired dispositions of this sort. A comparatively simple sentiment or emotional disposition is the result of frequent indulgence in a particular emotional state, such as anger (on the formation of the sentiment of "hate" (see above, p. 185).

Sympathetic Emotions.—In reference to this subject, we must observe that Shand's terminology differs from that which we shall employ. He uses the term "tender emotion"—which we do not use at all—to stand apparently for the purely altruistic factor in sympathy: he regards sympathy as not necessarily altruistic, and as needing the aid of "tender emotion" to become so.¹ We regard sympathy as an emotional disposition resting on the interpretation of other beings by ourselves; and it undergoes enlargement along with the development of the life of ideas. We are able to interpret the signs of another's feeling, if his emotion is one which we have felt ourselves, or even if it is one which we *have never ourselves felt*, provided it is one which we are humanly *capable of feeling*; otherwise, our ability to appreciate the feelings of others would be strictly limited to the range of our own experience. Persons whose sympathies are thus limited are regarded by common-sense

¹ See *Foundations of Character*, Book I., Chapter IV., Section 3, and the general argument of Chapters IV. and V.

as lacking in "imagination." The reach of sympathy beyond these limits becomes a powerful factor in enlarging the individual's outlook on life and even his knowledge of himself; the presence of others is a means of discovering the individual to himself, because *their* experiences are *actually or potentially his*, and he knows it. In its most undeveloped forms, sympathy is the mere repetition, as it were, of the feeling of another, as when we feel depressed at witnessing the signs of grief, pained at witnessing suffering, inclined to laugh at others' laughter. Such experiences are not necessarily altruistic; a man may feel this sympathetic pain, so called at the sight of suffering, and it may prompt him to go away and dismiss the scene from his mind, so as not to be troubled by it. The characteristic and distinctive nature of sympathy appears when we enter into the feelings of another being, and act out these on behalf of that other as if they were our own. This reveals the immense practical importance of sympathy—the prompting to *act for another person as for self*. This appears perhaps most clearly in *compassion*—the feeling which springs forth at the sight of suffering, and which leads directly to efforts for the relief of the sufferer.

The process of sympathy affords an indication of the fact which we arrived at through criticism of James' theory. The bodily symptoms of an emotion do contribute to the character of the emotion, but they do not initiate it, and they are not the whole of it. We do not, it is true, actually imitate or go through the manifestations of the emotion which we see in another; but so far as we apprehend them at all, we go through them in idea, and the mental representation of them is accompanied by nervous discharges which to a certain slight extent make us feel them. This helps or contributes to arouse the corresponding emotion in us. But this reaction is, of course, not the sympathetic feeling itself. The latter depends on the imaginative interpretation of the emotional signs which we perceive. In the case of new untried experiences this may be a matter of difficulty; and though it is certain that we *can* sympathise beyond our experience, cases may arise which are altogether outside the range of our sympathies.

In completely developed sympathy, there is always the active impulse to which we have referred; and for this, there is needed a considerable development of the capacity for forming free ideas of imagination, and of a common emotional life among the members of a community. The highly organised social life of a modern civilised country, with its closer and more systematic cooperation, affords ever new openings for effective sympathy, extending unfortunately beyond the power which the average man possesses, of mentally representing a fellow-creatures feeling *as his*, and feeling an impulse to act for *his* sake. But when the development of ideation has made possible the idea of a *common good*, sympathy makes possible its *valuation* (in the ethical sense) as superior to any personal limited good. This has been effectively stated by a very able Danish thinker of the last century, Harald Hoffding: "When sympathy leads to such a *valuation* it becomes an ethical feeling, . . . implying the idea of a connected whole of conscious beings, each of whom has his own special centre of life, and each of whom consequently has a claim to a special form and direction of sympathy. The view being thus enlarged, the individual feels himself only a single member of a great kingdom evolved in the course of ages; and the conduct to which the impulse of self-preservation or the impulse of momentary sympathy impel him, is controlled by the impulse to work for the advancement of this kingdom. When this impulse comes into more or less strong opposition to the egoistic or the narrower sympathetic feeling, it is felt, if it still succeeds in taking effect, as a law which requires the individual and limited to be subordinated to the universal and comprehensive."¹

Further reference to the ideal emotions, ethical, aesthetic, and religious, is beyond the limits of this book. They are the manifestations of deep-seated and complex *sentiments* which are characteristic and distinctive of human life. "A feeling may be very strong and deeply rooted without being violent, but is then more easily overlooked. The feelings accompanying ideal aims and relations are far less in a position to produce

¹ Quoted in Mellone and Drummond, *Elements of Psychology*, Sixth Edition, pp. 269-270.

momentary effects and sudden ebullitions than, for example, the primary feeling accompanying the various bodily functions. Ideal feelings are spread over a larger space of time, and take effect more secretly. And yet they are capable of possessing themselves step by step of the central position in the mind, and of employing in their service the accumulated energy originally under the control of those primitive impulses."¹

It has been said that "feeling is the conservative factor in mental life." It is true that by the indulgence of feeling, habits of feeling may be formed. It is sometimes true also that a feeling will not expand beyond its original object, and so brings about a kind of inertia in mental life. But to generalise such facts is very misleading. The "ideal feelings" or sentiments referred to above are progressive as well as conservative; they lead to the acquisition of new material as well as to the retention of the old.

Emotion and Instinct.²—The extensive discussion (during the last thirty years) of human instincts from the psychological point of view is due chiefly to the work of Professor William McDougall, in his "Introduction to Social Psychology," which has passed through twenty-four editions, with some important modifications of doctrine. His fundamental assumption is that instinct and emotion are objective and subjective sides of the same thing. In other words, we speak of "instinct" when we are thinking in terms of the individual's reaction to his environment, and we speak of "emotion" when we are thinking of the individual's subjective experience. Emotions, therefore, are "essentially indicators of the working of instinctive impulses." This is James' theory in a modified form, with the substitution of *instinctive impulse* for *organic or internal sensation*. The emotions become the "indicators" of the instinctive tendency aroused in us by a given situation. McDougall finds that his own view can be maintained only by limiting the name "emotion" to the

¹ Mellone and Drummond, *Op. cit.*, p. 230.

² Students are recommended to postpone reading this section until they have read Chapter XVIII. below.

so-called "primary" and "blended" emotions, and allowing it to the "derived" emotions only as a concession to popular usage. A "blended" emotion is "an emotional compound formed by the blending of two or more of the primary qualities of emotion"; but the resulting "compound" is *a new reaction* of the mind on the coming together of the "constituents." With this understanding, he treats of "scorn" as a compound of "anger and disgust"; "loathing" (or "horror"), of "fear and disgust"; "admiration," of "wonder and negative self-feeling (or submission)"; "awe" of "wonder, submission, and fear"; and so forth. In addition to the "primary" and "blended primary" emotions, he finds a class of feelings where the formula relating emotion and instinct does not apply: "an emotion of this class is not constantly correlated with any one impulse or tendency." These, as dependent on sentiments, he calls "derived emotions." Such are, sorrow, joy, hope, anxiety, despair. Shand points out that these, for example, are all related to *desire*. They are aroused in relation to the degree of success or failure in any desire in achieving its end. If the end seems likely to be attained, hope is aroused; complete attainment brings joy; with the possibility of failure, anxiety arises; as the prospects of failure become more evident, despondency arises, and when failure seems inevitable, despair.

According to McDougall, the "master sentiment," which forms the basis of character, is the self-regarding sentiment, the love of self in the widest sense (not to be confused with crude egoism or selfishness). This appears to involve a narrow view of human nature, unless we extend the meaning of self-regard to ideal ends like Goodness as such or Truth as such, regarded as forms of an ideal self. In cases when we seem to act along the line of greatest resistance, as when we follow an ideal in face of some temptation of a crude physical nature, the result is achieved because the ideal which we follow is linked up with our "self-regarding sentiment," with the experience of this emotional disposition about the idea of ourselves as we desire to be and ought to be. This, however, is a philosophical doctrine which passes altogether beyond the limits of psychology.

In the Introduction to his *Social Psychology*, McDougall gives the following definition of "instinct": "an inherited or innate psychophysical disposition, which determines its possessor to perceive and pay attention to objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or at least to experience an impulse to such action." In the seventh edition of his *Outlines of Psychology* he gives a list of thirteen primary instincts as inherited ways of reacting to changes in the environment, with the corresponding emotions; and he recalls his original view, from which he has not departed. In the first edition of the *Social Psychology*, "Emotion was regarded as a mode of experience which accompanies the working within us of instinctive impulses. It was assumed that human nature (our inborn inherited constitution) includes *instincts*; that the operation of each instinct (no matter how brought into play) is accompanied by its own peculiar quality of experience which may be called a primary emotion; and that when two or more instincts are simultaneously at work, we experience a confused emotional excitement, in which we can detect something of the qualities of the corresponding primary emotions. The human emotions were then regarded as clues to instinctive impulses, or indicators of the propensities at work in us. Guided by this hypothesis, I attempted to sketch the instinctive basis of our active nature, and its development, under experience and education, into character." He admits that there are difficulties in the application of the theory, but still he "holds fast to the scheme as essentially on the right lines."

We have no criticism to make on McDougall's definition of *Instinct* (quoted above); it is a definite conception, but it excludes certain important "general or non-specific innate tendencies," such as "suggestibility" (*Social Psychology*, Chap. IV.); and when it is combined with the theory that emotion is an "aspect" or "indicator" of an instinctive impulse, it results in what appears to be an inadequate and even narrow view of our emotional life. McDougall, in the Preface to his fourteenth edition, thus described the chief

differences between Shand's doctrine and his own: "he regards the emotions as highly complex innate dispositions, within which the instincts are organised as merely so many sensori-motor dispositions to particular bodily movements. A second important difference is that he regards the sentiments as innately organised systems of dispositions: thus, for him, both love and hate are innate sentiments, and each of them consists of the dispositions of four emotions, joy, sorrow, anger, and fear, linked together to form one system; but in my view, the sentiments are acquired through individual experience." It must be noted that Shand is not committed to regarding *every* "sentiment" as innate; and it may be maintained that Shand's theory of the subject enables him to take a broader, richer, and deeper view.

The word "instinct" has a literary and conversational use which is too vague for scientific purposes, although it has a "core" of definite meaning. In current speech and writing, an "instinctive" belief, or an "instinctive" action, seems to mean a belief or action springing from an impression or impulse which is not analysed or reasoned, as in the case of what we call "intuition." And in its biological and psychological uses, notwithstanding McDougall's definition, different writers employ it in different ways. In the Preface to the second edition of his *General and Social Psychology*, Dr. R. H. Thouless observed: "At no time did I believe (nor do I think that any responsible psychologist does believe) that human behaviour is determined by fixed inborn 'patterns' as is the behaviour of such organisms as ants. This, however, is what is often understood by critics of the conception of 'human instincts'; and it seems preferable to avoid a term leading to misunderstanding." For these reasons Dr. Thouless now substitutes the term "innate propensity" for "innate behaviour tendency." This does not involve any change of doctrine. With the caution referred to above, we have retained the term "instinct" in this book.

CHAPTER XVII.

THE SENTIMENTS.

Differentiation of Interest.—With the development of cognitive consciousness we become more and more fully and distinctly aware of what we want and of how to obtain it. The objects of conation become more complex and differentiated. This means that conation itself becomes more complex and differentiated. Interest progressively defines itself in cognition, and in defining itself transforms itself. In the process of satisfying one interest new results are experienced which gives rise to new interests. A child delights in letting things fall on the ground. He does this with an elastic ball and the ball bounces. The bounce itself is impressive and pleasing. Hence in the future, the general interest in letting things fall becomes in the case of the ball a specific interest in making it bounce. Similarly, a person may read a book in the first instance merely for the purpose of passing an examination. But as he reads he may become directly interested in the subject-matter. This development of interest goes on more or less throughout life.

The Genesis of Sentiments.—There is yet another and an immensely important mode in which previous interest generates new ones. An object which has been connected with agreeable or disagreeable activities, which has given rise to manifold emotions, which has been the source of various satisfactions or dissatisfactions, becomes valued or the opposite in and for itself. It becomes liked or disliked, loved or hated, for its own sake.

The child's interest in his mother is at first directly connected with her action in satisfying his needs and desires, in playing with him, and generally in co-operating in the development of his own psychical life. But in time he begins to love his

mother. He concerns himself with what she does and what happens to her, apart from any reference to other preformed interests of his own which she may help or hinder. The thought of her being grieved directly grieves him. The thought of her being pleased directly pleases him. The belief or even the imagination of her being ill-treated makes him angry. Her mere absence makes him cry, and her return makes him rejoice. He could not be compensated for her loss by the substitution of some one else like her.

In an analogous way he may come to attach value to inanimate objects, and especially to his toys. He may form a sort of affection for a tin soldier or stuffed rabbit. He may, for instance, take it to bed with him, and not be content unless he knows that it is under his pillow. When the toy is broken, it may not be by any means a sufficient consolation to give him another like it or superior to it.

Doubtless young children tend to represent their playthings as having a psychical life somewhat analogous to their own, so that the object of their affection is not for them purely impersonal. But it is quite possible to attach a sentimental value to an inanimate object without personifying it, except perhaps in an exceedingly dim way. We may form an affection for an old and well-tried pipe, or for a well-worn volume which we have used for years. The finest meerschaum or the most beautifully bound copy of the same book will not do as a substitute.

The child's love for his mother or his toy exemplifies what for want of a better name we may call a sentiment.¹ This word is very loosely used in ordinary language, and psycholo-

¹ Proposed first by Mr. Shand, *Foundations of Character*, Second Edition, p. 50.

This usage of the word "sentiment" is now generally followed by British psychologists. It is not, however, current amongst Continental or (with some exceptions) amongst American writers. These generally use "sentiment" very vaguely and with little agreement amongst themselves. Usually it seems to stand for a persistent emotion. The nearest Continental equivalent to Shand's "sentiment" is Ribot's "passion," as defined in his latest works. It is much to be desired that there should be a universally accepted name for an acquired emotional disposition.

gists in general have failed to give it a meaning much more precise. There can therefore be no harm in applying it as we propose. There is a link of connection between this application and the common use of the terms "sentimental" and "sentimentality." A person is said to set a sentimental value on a thing when he values it out of proportion to any special advantages which are derivable from it. It is sentimental to prefer an old and tattered copy of a book to a new one better printed and better bound. Ruskin's objection to railways is said to be sentimental, because it does not seem to be founded on any actual harm which they do, and overlooks the great advantages connected with them. It is sentimental in Lydia Languish to prefer an elopement to an ordinary marriage.

Now it is very far from true that all sentiments in our sense of the term are sentimental, but they all involve the valuing of an object for its own sake and not merely for advantages derivable from it. The popular usage has fastened especially on the particular cases in which the valued object appears not to be really valuable.

Sentiments are Dispositions, not Actual Feelings.—A sentiment, as we have defined it, cannot be actually felt at any one moment, as emotions can be felt. Its relation to emotions, conations, pleasures, and pain, as actually felt, is twofold. On the one hand it develops out of them. It is through the varied forms of agreeable interest felt by me from time to time when I have social intercourse with a man that I begin to entertain a sentiment of friendship toward him.

On the other hand, sentiments, when they have once come into being, are themselves independent sources of manifold feeling-attitudes and conations, varying with varying circumstances. They are complex mental dispositions, and may, as divers occasions arise, give birth to the whole gamut of the emotions. "In the love of an object," says Mr. Shand, "there is pleasure in presence and desire in absence, hope or despondency in anticipation, fear in the expectation of its loss, injury, or destruction, surprise or astonishment in its unexpected changes, anger when the course of our interest is

opposed or frustrated, elation when we triumph over obstacles, satisfaction or disappointment in attaining our desire, regret in the loss, injury, or destruction of the object, joy in its restoration or improvement, and admiration for its superior quality or excellence. And this series of emotions occurs now in one order, now in another, . . . when the appropriate conditions are present.”¹

With inversion of conditions these same emotions “repeat themselves . . . in the life history of every sentiment which we name dislike or hatred. There is pain instead of pleasure in the presence of the object, desire to be rid of it, to escape from its presence, except we can injure or lower its quality, . . . anger or fear when it is thrust upon us and persists, . . . regret or grief, not in its loss or injury, but in its presence and prosperous state.”²

Development of Sentiments in Complexity and Abstractness.—Sentiments may be conveniently though very roughly classified as concrete or abstract. The concrete have as their objects, individuals, or groups of individuals united in some kind of whole. The child’s love for his mother is concrete in this sense. Abstract sentiments, on the other hand, have for their objects some general feature of concrete experience. Love of power, of fame, of justice, of truth, come under this head.

The first concrete sentiments are directed toward individuals. The child begins by loving single persons, *e.g.* his nurse or mother. But as his experience widens and becomes more highly organised, a sentiment arises which has for its object the family as a social group, including all that is intimately associated with family life. This may be called the home sentiment. When it is strongly developed it lasts long after the home has been broken up. At school a special school sentiment is generated which may persist throughout life. A man of sixty or seventy may feel his heart warm at the sight of an old schoolfellow whom he cares little for, or even dislikes as an individual. At a later date, patriotism emerges; and this may be more or less comprehensive. It may be what is

¹ Shand, *Foundations of Character, Second Edition*, pp. 36-38, 55-61.

² *Ibid.*

called local patriotism, confined to the town or village or county in which a man is born or in which he lives. It may be love of his country in the narrower sense, *e.g.* of Scotland in distinction from England or Ireland, or it may be some kind of imperial sentiment.

Self-love which, when it passes certain bounds, is called selfishness, must be classed as a concrete sentiment having an individual for its object. It is connected with the conception of self as having private interests which may conflict with the private interests of others. So far as man's interest in doing a service to the public would be equally gratified by seeing some other person perform it instead of himself, self-love is not involved. So far as his satisfaction depends on the service being done by himself and not by another, it depends on self-love.

In general, self-love has, with certain modifications, all the characters of other forms of love. To love a person is to find satisfaction in his presence and dissatisfaction in his absence. Now a man is always locally present to himself, and therefore this local presence can afford him no special gratification. But the pleasure which we take in the presence of a friend is mainly a pleasure in social communion with him and in vividly realising all that his existence means for us. To this there is a counterpart in the case of self-love. Self-love is gratified by opportunities for attending to one's self so as vividly to realise one's own importance. It is gratified by talking about one's self or hearing one's self talked about, by finding others look to us for assistance and advice, and so forth. The pleasure some people take in seeing their own name in print or appending their name to a document is a typical instance of this gratification of self-love.

On the other hand self-love is disagreeably thwarted when the tendency to attend to ourselves and realise our own importance is in any way repressed, *e.g.* when we want to talk of ourselves and cannot get people to listen.

In other respects the analogy between self-love and the love of another is very close. We feel fear in the expectation of loss or injury to the self, anger when the gratification of self-interest is opposed, elation when we triumph over obstacles

in obtaining our own private advantage, regret when we suffer injury or loss, admiration for our own superior quality or excellence.

Pride, vanity, love of power and distinction, and love of fame are one-sided developments of self-love, and as being one-sided ought rather to be classed among the abstract than the concrete sentiments. Each has for object a certain general aspect of the life of the self. In pride what is especially valued is the superiority, or at least the equality of the self in relation to others. The emotions of wounded pride are especially excited by being obliged to feel and recognise dependence on others, by being compelled to ask their advice, to follow their lead, or to borrow money from them. On the other hand, the emotions of gratified pride are especially excited when we have occasion to realise vividly our own self-sufficiency or the dependence of others on us.

The distinctive mark of the proud man is that he takes pleasure in the independence or the superiority which he supposes himself already to possess. His complacency is disturbed only when anything occurs to disturb his pre-conceived high opinion of himself and of his position and belongings. In this respect pride differs from the general love of power or distinction. The ambitious man may restlessly seek for power and distinction, and may stoop to flatter others and place himself under unrepaid obligations to them in order to gain his ends. But the merely proud man finds such behaviour repugnant to him.

He is stably content with his actual position and condition, and feels no promptings to enter into competition with others for distinction and power which he does not already possess. Vanity is distinguished from pride, inasmuch as what it values is not merely superiorities or excellences of the self, but the express and emphatic recognition of these superiorities or excellences on the part of others. It thus involves a dependence on others which is repugnant to pure pride. The vain man boasts and brags ; he finds it necessary to make others admire and applaud him in order that he may enjoy what he supposes to be his own excellent qualities, achievements, or possessions.

Among abstract sentiments not connected with self-love we may refer the hatred of injustice or oppression, devotion to the cause of science, or art, or religion, the love of economy, or order, or cleanliness, detestation of humbug, or of affectation, or of servility. Carlyle's hero-worship was in a large measure a valuing of the abstract attribute of strength or efficiency for its own sake ; on the other hand, weakness and inefficiency as such excited his contempt and disgust. To hate injustice is not merely to resent wrongs done to ourselves or our friends ; it is to resent wrongs wherever they may occur, even when they are done to our enemies, or to persons in whom we have otherwise no special interest.

In one who feels this or analogous sentiments deeply and keenly, there is a tendency to personify the abstract quality. Consider, for example, the way in which Shelley and Byron wrote about Freedom, or Wordsworth about Duty. The lover of economy is shocked by seeing or hearing of wastefulness wherever it may be found, and even by the mere thought of it. The worshipper of riches feels a sentimental pleasure and admiration at the mere sight of a millionaire, or of accumulated treasure.

CHAPTER XVIII.

INSTINCT.

It has been found impossible to give an adequate account of man in his social relationships or of mental disorder without postulating inborn mental dispositions which are now commonly called "instincts." This conception, drawn from social psychology and from psychopathology, must also find its place in general psychology, for our general theory of psychology must be one which is found adequate to explain all the particular phenomena of mind studied in the various special branches of psychological investigation.

Instinctive Behaviour in Animals.—Amongst the animals we find kinds of behaviour leading to results serviceable to the animals themselves, but which are either partly or altogether independent of learning and the utilisation of previous experience. Examples are to be found in the complicated courses of actions gone through by certain insects to lay their eggs in such places and under such conditions as shall ensure to the young adequate supplies of food of a suitable kind when they hatch out. On a higher level of animal life, we see something similar in the one-year-old bird which builds its nest of the materials and in the form customary to its own species, although it has not in its adult life seen a nest of its own species, and it is fantastic to suppose that it is guided by memories of the parental nest which is left at the end of the previous spring. Ducklings hatched out under a hen will also swim without the example of older birds of their own kind. Similarly the incubator-hatched chick is found to strike, seize, and swallow small pieces of corn in the manner characteristic of its kind.

The solitary wasp's disposal of its caterpillar, the nesting of the young bird, the swimming of the duckling, and the eating behaviour of the chick are all examples of instincts. They are behaviour dispositions which are inborn and not acquired through experience. Although they are adapted to ends which are important to the animal possessing them, the first appearance of these instincts cannot be accompanied by awareness of these ends. The bird building a nest for the first time can have no knowledge of the eggs which that nest will shelter. If we could enter into the consciousness of the bird building its first nest, we should find that the building was the result of an internal compulsion sufficient in itself, and that it was almost certainly an activity in itself pleasurable.

As we ascend the animal scale (that is, as we pass from the study of animals with less to those with more complex nervous systems), we find a tendency for automatic congenital patterns of behaviour to be replaced by behaviour which shows more power of modification by experience. In other words, we find the behaviour becomes less automatic and more intelligent. By analogy with what we know to be true of ourselves, we may safely say also that as behaviour becomes less automatic and more modifiable by experience it becomes also increasingly accompanied by awareness.

Instincts which are almost automatic and invariable are clearly of high value to an animal living under conditions sufficiently uniform for fixed responses to be on the whole serviceable. Because the water in all ponds is a liquid of the same density and the same chemical properties, the young duckling's instinct to enter it and make paddling movements with his feet is in all circumstances a serviceable one. If the liquid in ponds were sometimes water, sometimes sulphuric acid, and sometimes absolute alcohol, a more selective mode of response would be necessary, requiring a greater complexity of nervous organisation and a greater intervention of conscious processes.

In accordance with the generally accepted theory of evolution we must suppose that animal instincts are inherited behaviour dispositions favourable to the survival of the species possessing them, which have become the possession of all the

members of the species through the operation of the laws of natural selection. It was at one time supposed that instincts begin as acquired habits of individual animals which, by their continuance through successive generations, finally become inheritable.

For many years this theory has been regarded as untenable on the ground that experimental evidence has seemed overwhelmingly to support the view that acquired characters are never inherited. The generally accepted theory at the present day is that behaviour dispositions vary sporadically just as do details of physical structure (probably, in fact, they depend on alterations in the physical structure of the nervous system), and that these variations are inherited as Mendelian unit characters. In this case, the variations of innate behaviour unfavourable to the survival of the individual exhibiting them would be quickly eliminated, while those individuals possessing favourable behaviour variations would finally completely supplant those not possessing them.

While it is reasonably certain that such natural selection of serviceable behaviour dispositions is an important factor in the development of instinct, we can no longer feel certain that there is not also a measure of truth in the older theory of the inheritance of acquired behaviour dispositions. We have seen that McDougall has brought forward evidence that dispositions of behaviour purposively acquired may be more easily acquired by successive generations.¹ If these results are confirmed, we should have here exactly the kind of inheritance of acquired characters which is necessary to validate the old explanation of the origin of instinct. It is too early yet to be certain of the significance of these results, but it is at least necessary to preserve an open mind as to the possibility that some part in the evolution of instincts is played by the acquired habits of successive generations producing modifications in the behaviour dispositions of their descendants.

Instinct in Man.—There are in man very few specific automatic responses of the whole body which are innate and

¹ Cf. p. 93.

not acquired. One of the very few which can be observed is the alternate extension and retraction of the two legs which takes place in walking. This movement is made by many babies during the first few days after birth when they are held so that the legs are free to move. But although this alternating movement is inborn, the actual achievement of walking will only take place later after a process of learning in which conscious effort will play a large part.

The behaviour of man is thus a complete contrast to that of those insects and other lowly organised animals whose behaviour is largely made up of innate specific responses which need no process of learning. If we were to define an instinct as an innate specific response of the whole organism, it would follow that man has very few and very unimportant instincts.

This would not, however, be the same thing as saying that the innate basis of human behaviour is unimportant. The tendencies to escape, to woo and mate, to fight, to form loyalties, and so on, are innate behaviour tendencies in man, although the particular objects which call out the tendencies and the particular behaviour which they employ are mainly determined by the mental history of the individual. It is such general tendencies as these that are called "instincts" by writers on human instinct (such as Professor McDougall).

Those who deny the legitimacy of the conception of human instincts commonly define an instinct in some such way as "a specific response to a specific stimulus," and then point out that man shows few such responses. This, however, is admitted by everyone, and such argumentation is clearly irrelevant to the question of the importance and universality of general innate behaviour tendencies in human beings. It is impossible to settle a question of fact by dispute about definitions.

It is important to be clear as to what we mean when we say that man has, let us say, an "instinct of pugnacity." It means that in certain situations or in the presence of certain persons he will experience the emotion of anger and will carry out violent behaviour or some substitute for violent behaviour (such as bad language, sarcasm, etc.).

The particular behaviour called out is, in great part, neither innately organised nor automatic. The very young baby strikes down with its hands at an object or person angering it, and this is probably a truly innate response. It is not, however, a very effective one, and the man who would effectively injure his opponent by striking with his hands must learn how to do it. He must learn to clench his fists, to keep his thumbs where they will not be sprained, to hit his opponent on the point of his jaw or on his floating ribs, to use one arm to guard these vital parts of his own body, and so on. The actual behaviour which makes effective the innate tendency to strike must be learned.

Also the behaviour in pugnacity is not necessarily automatic. Conscious selection and inhibition of impulses may take place. Even the simple behaviour of striking will not be very effective unless it is under conscious control. The impulse to strike may, moreover, be entirely inhibited and this response replaced by violent language or by the more subtle weapon of sarcasm. Even this may be inhibited, and the injured or insulted person may "heap coals of fire" on the head of his opponent. It was probably in this sense that St. Paul said "be not overcome by evil, but overcome evil with good." In cases like this where the kind of behaviour leading to the biologically normal end of an instinct (in this case injury or destruction) is replaced by behaviour of a totally different kind, we speak of "sublimation" or of "deflection" of the instinct.

What all these behaviour responses have in common is the emotion of anger experienced in the situation which called them out. This emotion, like other emotions, is accompanied by a vague conative tendency, a restlessness relieved only by activity of certain generic kinds. Generally these are the kinds which result in injury, physical or mental, to the object of anger. In deflection a substitution has taken place so that this restlessness is overcome only in some other way, perhaps by doing good to the person who is the object of anger.

We suppose that the physiological basis of the automatic instincts of the lower animals is an inborn organisation of the nervous system and of the musculature under its control, so

that a specific response of this musculature takes place on the perception of a specific stimulus. In the same way, the less specific innate responses of man may be regarded as having their physiological basis in innate organisations of that part of the nervous system—the autonomic nervous system—which controls the endocrine glands, the vaso-motor system and the unstriped musculature whose changes are the characteristic physiological accompaniments of emotion described by William James. On its physiological side the possession of an instinct means simply that there is innately organised a pattern of autonomic response which can be set into operation by a certain class of situations, and which is accompanied by a particular emotion and by a vague conative tendency which can be satisfied by a variety of actions directed towards the same end.

Not only is the actual behaviour which results from the activity of a human instinct not itself innately determined or automatic : it is also to be noticed that what actual persons or situations will call out the instinctive response is determined largely (but probably not entirely) by the mental history of the individual concerned. In early childhood, the situations which call out the response of violence are very generally ones which are not peculiar to the individual. Thus restriction of the limbs or deprivation of food are general (and probably innately determined) producers of the violent response. But later in life, the response tends to be called out only by some individuals and by some situations, and this specialisation is determined by the individual's mental history. Thus a child of eighteen months showed dislike of all men wearing spectacles as a result of a resentment first aroused by a doctor who examined her chest.

We say that the individual has a sentiment of hate against those persons or classes of person who always call out from him the response of anger. It is for this reason that in an earlier chapter, we spoke of instincts as the foundations on which sentiments are built.

We have here taken the instinct of pugnacity as an example of a human instinct. What has been said, however, applies also to the other human instincts—the instinct of escape, the

instinct of sex, the gregarious instincts, and so on. In all of these instincts, what is innately determined is rather a general direction of behaviour than a specific course of behaviour. The objects calling out the instinct and the particular behaviour organisations which will be used for the attainment of its ends are not innately determined to any considerable extent. When we say that a man possesses a sex instinct, we mean that he will tend to seek, woo, and mate a member of the opposite sex. We do not know what individual member of the opposite sex will call out this response, or what methods (except in a very general way) he will employ to woo her.

Instinct and Intelligence.—We have seen that the kind of behaviour in which the whole organism makes an invariable and automatic response to a given situation is highly serviceable only to a creature living in an environment sufficiently uniform to require only the solution of such unchangeable problems of behaviour as can be adequately dealt with by inherited automatisms. Such a condition is fulfilled, for example, by the environment of the cerambyx grub. This grub spends its larval period inside the trunk of a tree, and its complicated automatic actions of preparing a hollow in which it can turn into a pupa have been described by Fabre.

The biological disadvantage of invariable automatic reactions is that they are useless in face of unusual changes in environmental conditions. The insect which shows marvelously precise and well-adapted reactions in its accustomed environmental conditions, may simply die through failure to make any useful modification of these reactions if its external conditions are changed in such a way as to make them useless. The cerambyx grub's instincts would not be serviceable to it if it found itself outside the tree-trunk and it would have no other kind of behaviour serviceable under the new conditions of life.

Automatic instincts would be of little use to man for the purpose of enabling him to adapt himself to the complex and ever changing requirements of his environment. He is, on the contrary, continually in need of the power to adapt his

behaviour by conscious thought to the particular requirements of the present situation. In his behaviour, he utilises his past experiences to modify his present behaviour, to enable him to form plans for the future, and to guide his activity by thinking in such symbols as words and consciously controlled images. Behaviour so adapted is what we mean by intelligent behaviour.

While this power of intelligent modification of behaviour to meet the needs of particular elements in the external situation undoubtedly reaches its highest development in human life, it is found at a much lower stage of evolution. There is good reason for believing that it exists in a germinal form even amongst the highly automatic insects. As we ascend the scale of the vertebrates from the fishes, through the birds to the mammals, we are obviously passing along a scale of decreasing automaticity of response and of increasing intelligence. On the psychical side there is every reason for supposing that this is also a scale of increasing participation of consciousness in behaviour.

It is necessary to avoid the error of supposing that this new character of behaviour can be explained by referring it to a special "faculty" of intelligence. Intelligent behaviour is, like automatic behaviour, a response of the organism as a whole. To say that an organism behaving intelligently is using its "intelligence," is a piece of popular language which has no place in exact science. It implies that an animal's intelligence is a part of the mind as the eyes are part of the body. Indeed we cannot speak with precision of "the intelligence" without falling into the fallacy of creating an artificial entity which has, in fact, no real existence. We can, however, speak of a particular bit of behaviour as being intelligent, and we can properly use the word "intelligence" for that property of behaviour by which we judge it to be intelligent.

Nor can we properly contrast intelligent with instinctive behaviour. An animal which utilises its past experience in order to make an effective flight from an enemy is acting no less under the influence of its instinct of escape than one which runs mechanically from the danger. The maternal

instinct is no less the driving force behind the human mother's intelligent care for her child (directed by thought and by careful reading of the latest research on vitamines) than behind the relatively blind and mechanical maternal behaviour of the cat.

The real contrast is between intelligent and automatic behaviour. Behaviour of either kind may be instinctive. As the cerebral cortex has developed, the equipment of automatic instinctive responses has diminished. Human mothers do not (in spite of a widespread superstition to this effect) automatically do what is best for their infants. The less intelligent mammals, on the whole, do, although less perfectly than is commonly supposed.

In the maternal instinct, as in other instincts, there is both loss and gain in the replacement of automatic responses by intelligent ones. Automatic instincts are only serviceable under accustomed conditions. The human baby, by intelligent care, may survive many biologically unaccustomed conditions in its early months (shortness of its mother's milk, the illness or even death of its mother, etc.). Intelligence can provide for these contingencies as well as for the biologically normal situations. If the child had been a kitten with a mother dependent on automatic responses for its care, it must have died.

Although such instincts as the nest-building of birds and the sitting of the hen on her eggs appear without previous learning, there is no sufficient reason for regarding these as purely automatic activities unaccompanied by consciousness of the ends towards which the behaviour is directed. It would indeed be fantastic to suppose that the bird building its nest for the first time has any consciousness of the purpose which the nest is to serve, or that the hen sitting on her first clutch of eggs has any consciousness of the chicks which will hatch from them. It is arguable, however, that even the first performance of an instinctive action is accompanied by a vague prospective consciousness, "an awareness of the present situation as transitional."¹

In subsequent repetitions of the same performance, the

¹ Stout, *Manual of Psychology*, Fifth Edition, p. 345.

behaviour is certainly no longer blind, and a bird may on its second or later attempts at nest-building show the variation of effort which seems to indicate some prevision of the end to be attained.

The Measurement of Intelligence.—Man has a much greater power of making intelligent adaptations of behaviour to the requirements of new situations than has any other animal. The extent of this capacity differs also from individual to individual. Since the power of intellectual learning and of acquiring skill depend on the extent of the intelligence of the individual, the measurement of intelligence is a practical problem of great importance.

This problem was originally solved by the genius of Binet who constructed the first scale of intelligence tests. This scale in various revised forms is still in use, and also we now have other kinds of intelligence scales which are in some respects preferable to that of Binet. We can best express the characteristics underlying the various intelligence tests by describing them as series of problems of graded difficulty, which must be solved either by appropriate behaviour or (more commonly) linguistically.

The use of intelligence tests for children has proved to be a brilliant success of applied psychology. It has been found possible to measure innate capacity and therefore to predict subsequent achievement with an accuracy and reliability much greater than could be attained before.

The practical usefulness and the reliability of intelligence tests were demonstrated before the theoretical problem of the exact nature of the mental capacity which they measured was satisfactorily solved. Those who were engaged in the practical problems of intelligence testing generally gave descriptions or definitions of the nature of intelligence. Although these were in fundamental agreement as to the fact that intelligence was what distinguished man from the lower animals and that it was characterised by the power usefully to adapt behaviour to new situations, the more detailed accounts of the nature of intelligence showed considerable confusion. From this confusion, psychology has emerged by

the brilliant mathematical treatment of the subject by Professor Spearman.¹

Professor Spearman showed that if a large number of persons were tested in performances of various kinds, and the correlations² between the orders obtained in different performances were worked out, it was possible to discover how far different abilities were independent of each other and how far they were dependent on factors common to other abilities. He showed that the general rule was that any particular ability of an individual depended partly on a "general factor" common to all the abilities of that individual, and partly on a "specific factor" which belonged to that one ability alone. These factors he called g and s respectively. Factors common to a small group of performances (such as were implied in the old doctrine of mental faculties and in modern doctrines of the same kind) were found to be few and relatively unimportant.

This is known as the "two factor theory of ability." Its importance for our present subject lies in the fact that the general factor common to all performances is the "intelligence" we are trying to measure in intelligence tests. The two-factor theory also gives us a criterion by which we can judge the efficiency of different tests of intelligence. Simple mechanical operations (such as speed of tapping) are found to depend little on the general factor—*i.e.* an individual of high intelligence will show little tendency to excel in them. Operations involving reasoning even of a very simple kind, on the other hand, depend for the efficiency of their performance almost entirely on g . It is the latter, therefore, that are the best material for tests of intelligence.

¹ "The Abilities of Man—their Nature and Measurement," C. Spearman, London, 1927.

² A correlation is the measure of the extent of agreement between two orders. If the same group of persons is tested in two abilities and the orders obtained in both are nearly the same, the correlation between the two performances is high. If, on the other hand, the two orders are very unlike, the correlation between the two performances is very low.

CHAPTER XIX.

VOLUNTARY DECISION.

Development of Will.—The term “ Will ” is sometimes used, in a very wide sense, for conation realising itself. Sometimes it is used in a very restricted sense for voluntary decision, resolution, or choice. Such decision, resolution, or choice involves the presence of at least two conative tendencies, and a preference on the part of the self of one to the others. The resulting action is determined by this preference, and not merely by any one of the alternative tendencies between which a decision is made. It is only in reference to such intervention of the self in deciding between alternative lines of conduct, that we can speak of the freedom of will.

Voluntary decision is a relatively late product of mental development. On the purely perceptual level, action follows the immediate impulse arising out of the circumstances of the moment. It is prompted and guided by the perceived situation without any train of ideas representing the end pursued and the means of its attainment. At this stage there can be no voluntary decision, because there is no presiding self to make it. The self of perceptual consciousness is merely the self of the moment, just as its world is just the actual situation present for the time being to the senses. There may be hesitation between conflicting impulses, as when a dog is recalled from chasing a rabbit by his master’s whistle. But the result is determined by a direct trial of strength between the competing tendencies, not by a voluntary decision preferring the one to the other.

As the life of ideas develops desire takes the place of merely perceptual impulse. Conation, instead of issuing directly in

bodily action or failing altogether to find an outlet, dwells on the idea of its end and the ideally represented means of its attainment. Further, the object may be itself more or less a result of free ideal construction. We can not only "desire to live again through experiences of which there is nothing actually present to remind us";¹ we can also desire what we have not previously experienced at all.

With the progress of conceptual analysis and synthesis these ends become more complex, more remote from the present situation, and more generalised. Thus ends come to be pursued which demand the labour of a lifetime; others again require the combined effort of many individuals, each making a relatively small contribution to the common cause. Often the desired object is one which cannot be fully realised within the lifetime of the agent.

Another aspect of this process is the organisation of conative tendencies in a more or less unified system. Each separate end is pursued, not only for its own sake, but also as a step toward or away from other ends. It is regarded as part of a general plan of life. We eat not only because we have an appetite for food, but also because we cannot do other things, or live at all, without eating. A student reads a text-book not only because he is interested in the subject-matter, but because he desires to pass an examination; he desires to pass the examination not only because he wishes for evidence that he really knows something about the subject, but also because he desires a diploma; this again is wanted as a step to entering on a profession; the profession again is valued partly as a means of playing a respectable part in the general order of society, partly as a means of making money which shall enable him to marry.

In this system some ends are relatively more comprehensive and ultimate; others more special and immediate. To take one's place in the social order by becoming a doctor or lawyer is an end more ultimate and comprehensive than reading a text-book or passing an examination. It is through such organisation of conative tendencies that the self comes to possess and to recognise its own permanent unity and identity.

¹ Ward, *Psychological Principles*, Second Edition, p. 281.

in the various phases of its life history, past, present, and future, actual and possible. Only in so far as the self of the present moment is connected by such continuity of interest with the self of past moments, can it *own* the action of the past self, and feel responsible for them. Now it is especially for what is directly or indirectly due to his own voluntary decisions that a man feels responsible. This is because voluntary decision between alternative lines of conduct essentially involves an appeal to the self as a unified system of interest.

Actions which are Intentional but not Due to Voluntary Decision.—Action is intentional so far as we have ideal prevision of its course, the end to be attained, and its collateral consequences. All actions due to voluntary decision are intentional. But the inverse is not true. Routine conduct may be intentional without involving any decision or resolution. We intentionally eat at regular meal-times, and do the details of business in the accustomed order, taking at the accustomed times customary recreation. But all this may take place as a matter of course. We may never even vaguely raise the question whether we are to do these things or abstain from doing them.

Even when there is a conflict of tendencies, intentional action does not necessarily presuppose a voluntary determination. A man may be led by the interest of an exciting meeting to stay on at it, even though he feels that he ought to go home and go to bed. He stays on in spite of an opposing tendency which creates misgiving and discomfort. Yet he may never distinctly determine to stay instead of going. He simply drifts into his actual course of action. The conflict is a mere brute trial of strength between competing tendencies, not a comparison of ends resulting in a preference of one to the other.

Self-consciousness as the Essential Factor in Voluntary Decisions.—What is distinctive of voluntary decision is the intervention of self-consciousness as a co-operating factor. The effect of realising this or that special conation is considered in its bearing on the general system of interests

belonging to the constitution of the self as a permanent unity. If a conation is realised, the completed action becomes part of the life history of the agent. If in contemplating it beforehand the agent takes this into account, if he asks himself whether he really wants this action to become his action and so to become included in his own conception of himself, he is on his way to the forming of a voluntary decision. The decision may follow immediately, or it may not take place until after a process of deliberation.

Deliberation intervenes when more or less time is taken in mentally realising from various points of view the bearing of the contemplated course of action on the unified system of interests of the self as a whole. Suppose, for instance, that I have to decide whether or not I shall become a candidate for a certain appointment.

I mentally dwell on the trouble and unpleasantness connected with the competition and the likelihood that after all I may be rejected. I consider the nature and amount of work which I shall have to do, if I am appointed. The work may involve much uncongenial drudgery, likely to interfere with cherished pursuits for which I feel myself to be better fitted. On the other hand, I have to take into account the attractions of an increased salary, a wider sphere of usefulness, and a more distinguished official position. I turn over these points in my mind in their connection with each other, endeavouring to appreciate their relative importance in the organised system of my life's interests. Finally, the process comes to a conclusion of transforming itself, perhaps more or less abruptly, into a settled determination either to apply for the post or not to do so.

We may describe a typical process of deliberation as follows : A certain line of action being suggested, I ideally develop the conception of myself as I shall be if I carry it out so as to make it part of my actual life history, and on the other hand I ideally develop the conception of myself as I shall be if I refrain from acting in this way. I thus follow out the representation of a hypothetical self in more or less detail, until I have formed a decision, or, to use an expressive phrase of popular language, until I have made up my mind.

Motives and their Fluctuations.—The term “motive” is ambiguous. It may refer to the various conations which come into play in the process of deliberation and tend to influence its result. Or it may refer to the conations which we mentally assign as the ground or reason of our decision when it has been fully formed. In other words, a motive may be either a motive *for* voluntary decision or a motive *of* voluntary decision.

It is in the first sense that the term is used when deliberation is described as a *weighing* of motives. This is a convenient metaphor, but very apt to mislead. When we weigh things, the presupposition is that they have already a fixed weight independently of the process of weighing them. The weighing is merely a way of ascertaining what this predetermined weight is. But the strength of motives is no such fixed quantity. It varies in and through the process of deliberation itself. When I first begin to consider whether I shall become a candidate for an appointment, the prospect of an increased salary may influence me strongly. But as the process of making up my mind develops, this motive may come to weigh less and less with me. It may almost cease to be a motive at all.

This holds good of the peculiar dominance which motives acquire when they cease to be merely motives for deciding, and become motives of a decision already formed. It is untrue to say that the motives of the decision were the stronger from the outset, so that the decision merely acknowledges a pre-existing fact. On the contrary, it is in the decision itself and the process of deliberation which leads to it, that the motives which are the ground of it gain the strength which enables them to determine conduct.

What is a Voluntary Decision?—So far we have dealt only with the conditions under which a voluntary determination emerges. We have yet to ask what is its nature.

Clearly it consists in a certain predominance of conative tendencies. But wherein does this predominance consist? In all probability the only ultimate answer is that we are here confronted by a unique differentiation of conative

consciousness incapable of exhaustive analysis and description.

There is, however, room for analysis and descriptions which do not pretend to be exhausted.

In the first place, it ought to be plain, after what we have already said, that voluntary decision is no mere mechanical resultant of the play of tendencies partly re-enforcing and partly neutralising each other. The strength of the prevailing motives is no mere remainder left over after subtracting the strength of counter motives. The analogy of the mechanical composition of forces is utterly inapplicable. In forming a resolution I may have great difficulty in making up my mind, because the pros and cons appear equally balanced. But when the resolution is once made, it may be in a high degree firm and stable. I may carry it out with unflinching vigour and pertinacity when once the Rubicon is crossed and my mind is made up.

The motives which constitute the ground of decision are the only motives which remain operative after the decision is made and so long as it is persisted in. The opposing motives which played a part in the deliberative process cease to be motives when deliberation is over. The corresponding conative tendencies either cease to be felt or they survive only as difficulties and obstacles in the way of carrying out our resolution.

Whether they will persist or disappear depends on the special circumstances of the case. Subsequent conditions may be such as either to keep them alive or to divert attention in other directions. When a man with a craving for drink resolves to abstain from it, he cannot by so doing abolish the animal appetite itself. The animal appetite is maintained by organic conditions which are beyond his control. In carrying out his decision he has to do battle with it. On the other hand, if in spite of conscientious scruples he resolves on indulgence, the conscientious scruples soon cease to give him any discomfort. They disappear as he drinks. It is a broad way that leadeth to destruction.

Regulus, in determining to return to Carthage, could hardly dismiss from his thoughts all that he was giving up and the

violent death which awaited him. Probably if he had decided to remain at Rome, he would not have been troubled in nearly the same degree. Surrounded by his family and friends, and with all kinds of congenial channels open for his activity, he would probably have been able to avoid dwelling on the thought of his violated promise.

Further, voluntary decision is essentially characterised by a certain belief. It finds expression in the explicit affirmation or the implicit assumption that so far as depends on us as we are at the time of deciding, we shall, on the ground of certain motives, act in a certain way in preference to other possible lines of conduct. In voluntary determination, "I will" is also "I shall." Indeed, we find the two forms of expression used interchangeably in popular speech as if they were synonymous.

Of course, the judgment "I shall" is conditional. It means that we are going to do something if we are not prevented by obstacles. This reservation need not refer merely to external hindrances. In saying "I shall do this and not that," we may be aware of the likelihood of counter conations arising strong enough to break our purpose. When a man says "I am going to give up smoking," he does not mean to exclude the possibility of future temptation proving too much for him. The self to which the judgment refers is the self at the moment of decision as he is then conscious of it. It is more or less of a presumption, and often an ill-founded presumption, that this self will not alter so as to make us act contrary to our present resolve.

Finally, the self of self-consciousness receives in deliberation and voluntary decision a unique qualification. It is only in these processes that we become aware of ourselves as free agents.

Freedom of the Will.—Let us put ourselves in the position of a person who is engaged in making up his mind which of two alternative ends he will pursue. Plainly his future action must appear to him as not yet determined; for it depends on his decision, and what this decision will be is not determined until his mind is made up. Further, the kind of indeter-

minateness which appears to him to attach to his decision is not at all like that of a future event which is beyond his control. For the indeterminateness of this is due merely to his ignorance. It can be removed merely by waiting to see what will take place, or by obtaining data which enable him to foresee the course of coming events.

But a man cannot merely wait to see what his own voluntary decision is going to be ; he cannot do so because he has to make it himself. Nor can he calculate beforehand how it is going to turn out. This is impossible, because from the nature of the case he cannot be in possession of the requisite data. He cannot found his calculation on the relative strength of motives. For the relative strength of motives is not a ready-made datum which persists unaltered through the process of deliberation, and into the moment of decision.

As we have seen, the metaphor of weighing or balancing is here profoundly misleading. Motives become stronger and weaker, and even come into being or disappear in the process of making up the mind. And the person who is making up his mind cannot predict beforehand what motives will become predominant so as to constitute the motives of his voluntary decision. He cannot know this until the decision is actually made. Before this the assertion that some one motive or group of motives is already of such strength as to determine his choice, is tantamount to the assertion that he is not engaged in choosing at all. In other words, it is equivalent to a denial of the freedom of his will ; and this again, if we mean by will voluntary decision, is equivalent to a denial that he has the power of willing at all.

This account of what is meant by free will resolves it into self-determination. My future decision is indeterminate for me before it is actually formed, because I have myself to determine it. So much at least is necessary to the conception of freedom, and so far there can be no reasonable doubt that we really are free. But according to a certain school of philosophers this is not sufficient. To understand their position we must approach the subject in a new way. Instead of placing ourselves at the inner point of view of a person who is engaged in making up his mind, and considering

his mental attitude, we must suppose ourselves to be looking back on his already formed decision, and the deliberation which led up to it. The question then arises whether there is any stage of the completed process which is not an outcome of previous stages and of pre-existing psychological and other conditions,—including the total character, past history, present circumstance of the self.

Those who simply identify freedom with self-determination say no, those who go by the name of libertarians say yes. According to the *libertarian* or *ineterminist* there is in the moment of decision a possibility of alternate choice independent of all pre-existing conditions, including even the whole nature of the person choosing. On the other hand, those who regard self-determination as in itself constituting freedom, say that the self, in determining its own decision, does so in accordance with its own nature. They profess themselves unable to understand what self-determination could mean, and therefore what freedom could mean, on any other supposition,—if any other supposition were intelligible.

To discuss this vexed question would lead us beyond the limits of psychology into ethics, metaphysics, and theology. However it may be answered, we can at least say the position of a person deliberately making up his mind which of two courses he will pursue, is perfectly unique. There is nothing else at all analogous to it. And certainly we can find no better word to indicate its peculiarity than *Freedom*.

CHAPTER XX.

SURVEY OF PROFESSOR STOUT'S WRITINGS ON PSYCHOLOGY.

By S. H. MELLONE.

In the Preface to his *Analytic Psychology*, his first published systematic contribution to the subject, Dr. Stout observes: "The time is rapidly approaching when no one will think of writing a book on Psychology in general, any more than on Mathematics in general: the subject may be approached from the point of view of mental pathology, of sociology, and of psycho-physical experiment: each of these branches of the subject has its own data and its own distinct and independent ways of collecting and estimating evidence." This was written in 1896; and the anticipation has been more than literally fulfilled. Not only have the different branches of psychology been distinguished and given separate treatment, but the field of investigation in each branch has grown larger. A conspicuous case is that of the methods and theories developed by Sigmund Freud under the name of "Psycho-analysis," which arose out of certain special studies in mental pathology.¹

These facts being recognised, an additional consideration of vital importance emerges. It is thus stated by Dr. Stout. "By the side of these special lines of investigation, the time-honoured procedure of such men as Hobbes, Locke, Berkeley, Hume, and Bain, still holds its own, and has its distinctive value. Indeed, its value is enormously increased by the fact that it is not now the whole of psychology, but only a fragment of it. It may now be fruitful not only within its own limits, as it has been in the past, but as a help to inquirers on other

¹ See, for example, *Contemporary Schools of Psychology*, by Professor R. S. Woodworth.

lines. . . . But to be of any value at all, it must stand on its own basis and use the evidence appropriate to it. . . . Its aim is to bring systematic order into the crowd of facts concerning our mental life revealed by analysis of ordinary experience; its function is to describe, analyse, and arrange." In this respect, it is distinguished from "Genetic Psychology," which proposes to itself the task of tracing the various stages in the evolution of the individual mind from its lowest to its highest planes. This is, in the main, the subject of the author's *Manual of Psychology*, of which the fifth edition (revised in collaboration with Mr. C. A. Mace) was published in 1938.

The purpose of Analytic Psychology, as expounded by Dr. Stout, is (in the first place) to determine the nature and mutual connection of those ultimate conditions of consciousness, or modes of being conscious, which do not admit of genetic derivation but, at the most, only of definition and description; and (in the second place) to investigate the general laws of mental process (the conditions under which changes take place in consciousness) by an analysis of what takes place in the fully developed mind. In this respect its procedure may be compared with that of the geologist, who acquires his knowledge of the nature of geological changes by observation of the changes which are taking place at the present time.

In order to discover the facts, we appeal to introspection, retrospection, and to communication with other minds, the last being a derivative method which presupposes the other two. It is obvious that there is no such thing as direct observation of other minds; all that is immediately perceptible consists of "sensible signs and tokens" of inner events; and these "signs and tokens" are interpretable only through knowledge attained by introspection or retrospection. Physiological knowledge is of secondary importance for psychology, which must do its own work on its own lines. In studying the uniformities that can be observed or inferred in the course of mental events themselves, we are not obliged to appeal to physiological or other extra-mental "explanations," except in so far as the mode of occurrence of certain kinds of conscious

process, or their inter-connection, is most clearly and intelligibly stated by reference to physiological and co-operating conditions. We may also legitimately make use of the hypothesis of *mental dispositions*, either with or without reference to their physiological aspect. That this "hypothesis" is necessary was effectively shown by Dr. Stout in another connection. "The onward flow of thought depends at every moment of its course on the co-operation of an organised system of conditions which have indeed been formed in and through bygone conscious experience, but which are not themselves present to consciousness. Consider, for example, the process of recollecting a name. The endeavour to recollect it is a conscious process, but its success or failure depends on another factor. It depends on the trace or disposition formed in the course of previous conscious experience in which the name occurred. It may happen that we fail to remember the name while we are trying to do so, and that it suddenly emerges into consciousness after an interval, during which we have been occupied with other matters or have been asleep. This implies that our conscious effort has set going an unconscious process which continues after the conscious effort has ceased. Now, what holds good of the attempt to recall a name holds good throughout our mental life. Whether my thoughts come to me fast or slow, easily or with difficulty, they come to me only through the co-operation of unconscious conditions. My conscious processes constantly set in operation processes, below the threshold of consciousness, which in their turn give rise to new developments of conscious process. My conscious activity is never the sole factor involved. It always makes appeal, so to speak, to something else, and awaits the result, which may or may not be such as it requires."¹

The difficulties of Introspection, which are generally admitted, are discussed by Dr. Stout in his *Analytic Psychology* (Vol. I., pp. 42-46), and in his *Manual of Psychology* (5th edition, Introduction, Chap. II., §§ 5 and 6; see also p. 13 of this *Groundwork*).

¹ "Hibbert Journal," October, 1903.

We must observe that even "Experimental Psychology" depends on Introspection, since it is the employment of Introspection under test conditions. A remarkable development of the doctrine that Introspection is either impossible or scientifically worthless, is seen in the work of a group of writers who advocate what they call "Behaviourism," that is, an exposition of "Psychology" without any reference to mind or consciousness. "Behaviourism" claims to be a theory of the subject-matter and method of Psychology. (i) The subject-matter is "behaviour" exclusively, where "behaviour" means "the total muscular and glandular changes which follow upon a given stimulus"; (ii) "Behaviour" is scientifically explicable without reference to what are commonly called "mental" processes: it is possible to write a Psychology and never use the terms "consciousness," "will," "imagery," and the like. Now this evidently leaves open a field for important experimental work on stimulus and response; but what is it as "psychology"? The reply is that the behaviourist's first proposition can be shown to be false in any test case which is examined, as for example in the psychology of *thinking*, which the behaviourist is committed to "explain" as merely the action of "language mechanisms"; and the behaviourist's second proposition might be true although the first is false, but his position would then approximate to psycho-physical parallelism (*Manual of Psychology*, Introduction, Chap. III., §§ 7 and 8). Then the question would be, what new evidence in support of this theory has the behaviourist adduced? The answer is, that he has adduced no new evidence.

It is the simple truth to say that Dr. Stout's *Analytic Psychology*, although published nearly fifty years ago, is a contribution of permanent value to the study of mental life. The aspects of the process of *knowing* upon which he lays most stress are even now far too much neglected. The importance for knowledge, of the consciousness of mental wholes or unities; the thesis that the consciousness of any such mental whole does not depend upon a detailed consciousness of its parts, and that the "noetic" process cannot be reduced to a mere series of mental images; the analysis of the process

whereby we become aware of the *meaning* of a train of thought: all these discussions are still valuable and suggestive in themselves, and contain implicitly, and sometimes explicitly, anticipations of recent and independent work on these topics. For example: light is thrown on the analysis of the consciousness of *relations*—a problem which William James stated by means of a characteristic use of the word “*feeling*”: “There is not a conjunction or a preposition, and hardly an adverbial phrase, syntactic form, or inflection of voice in human speech, that does not express some shading or other of *relation* which we at some moment feel to exist between the larger objects of our thought.... We ought to say, ‘a feeling of *and*,’ ‘a feeling of *if*,’ ‘a feeling of *but*,’ ‘a feeling of *by*,’ just as readily as we say ‘a feeling of *blue*,’ or ‘a feeling of *cold*.’” James censures the “empirical” psychologists (*i.e.* the “associationists”; see above, pp. 15 and 28) for ignoring all “dumb or anonymous mental states,” or, if recognising them at all, naming them after “the substantive perceptions they lead to, as thoughts *about* this object or *about* that.” The word “*about*” at once conceals and reveals the problem which Dr. Stout has in view.¹

It is, of course, neither desirable nor possible here to attempt any kind of outline of Dr. Stout’s *Analytic Psychology*; but to illustrate the method which the author employs, we proceed to describe his treatment of two questions of outstanding importance: the analysis of *mental activity* (Vol. I., pp. 143ff), and the analysis of our *apprehension of form* (Vol. II., pp. 65 ff).

The popular use of the word “*activity*” often makes it a mere synonym for causality in general. In reference to mental life, it means *self-caused change*. Conscious life has a current of its own, is always to some extent self-sustaining, and tends by its intrinsic nature to a certain direction or towards a certain end. The comparatively active processes of consciousness are contrasted with the comparatively passive processes, such as mere perception, because there is no reason *within consciousness* for the transition from the perception of one object to that of another. Compare

¹ James, *Principles of Psychology*, Vol. I., pp. 255-256; Stout, *Manual of Psychology*, Fifth Edition, pp. 155-156.

two cases in which the degree of mental activity as contrasted with mental passivity varies in a marked manner. "Sitting in a railway carriage, I observe the scenes which in rapid succession displace each other within the field of vision. So far as the sequence of impressions depends on the movement of the train, the flow of consciousness is passively determined. So far as this is the case, there is no reason within consciousness for the transition from the sight of one object to the sight of another. Of course, I am by no means wholly passive in the matter. The course of events within consciousness would be quite different if I were not attending to the scenery; and the special direction of my attention, as dependent on my interest, largely determines the points which are noticed to the exclusion of others. But the activity involved is obviously of a lower grade than that which is involved in a train of reasoning or a systematic effort to recollect a series of events. In such cases we deliberately seek for a certain series of ideas, and their occurrence depends upon our conscious endeavour, as well as on the preformed associations and other conditions which lie outside the field of consciousness." Bearing in mind that no change within consciousness is entirely determined from without, we conclude that mental activity exists *when and so far as* a process in consciousness is the direct outcome of previous processes in consciousness, having its starting point and terminal point within the current of consciousness; and, as we have explained in the foregoing pages, the activity thus defined is *selective and adaptive*; what occurs in consequence of it is such as to meet a mental or conscious end.

The author points out that mental activity is never "pure"; in other words, the mental process determines changes which occur outside of consciousness, say in the brain; and those changes in their turn react upon the conscious process. But the impossibility of *isolating* immanent or direct self-determination is no reason for regarding it as a fiction.

The question then arises, how exactly do we *become aware* of our mental activity? Do we know it only indirectly by its effects in consciousness? Dr. Stout replies that "mental activity exists in being felt; it is an immediate experience;

the stream of consciousness feels its own current." And within what is felt, in the process, is included the contrast between the process "in so far as it contributes to its own self-sustainment and development, and in so far as it is determined by conditions extraneous to itself," involving "an immediate experience of its effectiveness or ineffectiveness, its freedom or constraint." To be mentally active is to be mentally alive or awake; there is no such thing as an *entirely passive* consciousness. There can be no reasonable doubt as to the facts. There *is* attention in consciousness; there *is* a constant striving for ends; in a word, there *is* a mode of consciousness which is conveniently named "conation." But the doctrine of an immediate experience or "feeling" of mental activity is difficult. More recently in the Preface to his volume *Studies in Philosophy and Psychology* (a collection of essays, most of which had been previously published in less accessible quarters), the author makes the following comment: "The 'self' of self-consciousness is primarily an embodied self. . . . Hence the activity of the 'self,' though it essentially involves mind, does not belong to mind alone, abstractly considered. . . . The concept of a purely mental action is very difficult, even if it is possible at all; the most abstract thinking is experienced as a strenuous bodily effort."

In the above-mentioned volume of Studies, in the Essay entitled "The Nature of Conation and Mental Activity," Dr. Stout employs the expression "felt tendency" as descriptive of Conation in the psychological sense of the term. A conscious process is active when it *tends* by its intrinsic nature to develop into something else; and the "something else" is its purpose or end. When we say that anything "tends" or "has a tendency," we mean (1) that in the absence of outside hindrances, it will issue in a certain result, and (2) that it will maintain its own positive nature in and through the result. For example: an *acorn* may be crushed into a shapeless mass, or it may grow into an *oak*. But we do not speak of it as having a tendency to be crushed into a shapeless mass, whereas we do naturally regard it as having a tendency to grow into an *oak*. The reason is that we consider it as main-

taining its distinctive "acorn nature" in becoming an oak, but not in being crushed. The mental fact which we call Conation is a clear instance of tendency in the sense defined. In the process of attaining its end, it is "realised" or "fulfilled" instead of being destroyed or suppressed, and it always proceeds to the attainment of its end if, and so far as, other conditions permit.

In Chapter VI. (above) it was explained that "Attention" is not a separate mental *faculty*. What then is the relation of Attention to Conation? "Conation" is logically an abstract term, and therefore cannot be used in the plural. Just as the abstract term *humanity* stands for what is exemplified or typified in particular men, and consists of those qualities on account of which they are called human beings, so *conation* is exemplified in particular acts of will or mental endeavour in the widest sense (including disposition, interest, want, wish, desire, impulse, attention). And since conation is an abstract term, we cannot do more than give a general indication of what it means; but in speaking of particular kinds of conation we are no longer dealing with this characteristic in the abstract, but with particular kinds of mental endeavour in the concrete. When a conative process finds its satisfaction in increased clearness or distinctiveness of modes of knowledge (perceptions or ideas) it is called *attention*.

The second outstanding illustration of Dr. Stout's method (in the *Analytic Psychology*) is to be found in his chapters on "The Apprehension of Form" (Bk. I., Chap. III. and IV.; Vol. II., pp. 65 ff.).

The "form" of a mental whole, or series of related mental processes, is something which is relatively independent of the particular constituents of the whole. A simple example is that of a melody played in different "keys." The whole can be apprehended as such and as a unity (the musical value of the melody may be appreciated) while there may be very different degrees of apprehension of the plan of its constitution or on the precise relations which it contains. A particularly instructive example is that of the *meaning of a word*, which may be apprehended apart from imagery and without discrimination of the multiplicity which it really comprehends.

Here we find an important class of cases in which we become aware of a whole without distinguishing its parts. But examples are also to be found in *wordless* thought, as when we gather up in a few moments the result of a series of successive steps. Thus Lotze observes: "When we have listened to a poem recited or to a melody sung, and forget the words or the tones, while yet all that was in them lives on in an abiding mood of our mind; when we first send our glance over the scattered details of a landscape, and then, after the definite outlines have long disappeared from our memory, still preserve an indelible total impression: we make combination and fusion of myriads of details into the whole of a supersensible apprehension, which we may reluctantly analyse into its constituent parts in order to communicate it to others" (Stout, *Manual of Psychology*, 5th edn., p. 156).

The further development and application of these principles are dealt with by the author in the second volume of his *Analytic Psychology*, under the name of "Noetic Synthesis." Here we have the foundations of a psychology of *thinking* in the strict sense of the word. The most general character of "noetic synthesis" is the union of presentational factors in so far as they are "specifying constituents of the same thought," or refer to the same object. Take the case of *sense-perception*. Perception is not a mere combination of presented and revived experiences of "sensations" and "mental images." The perception of the whole object is based on various successive presentations of some of its parts; but it is not the sum of the percepts of the parts, some of which, in fact, may not be presented or experienced at all, as in the case of "the unvisualised apprehension of the interior of an object." Our apprehension of what the *whole* object is, is like our apprehension of the meaning of a word. The parts presented *mean* the whole, apart from any mere association of part with part.

In "ideal revival" we have "noetic synthesis" at a higher level, combined with selectiveness. We may have a mental grouping which persists as a mental disposition when it has ceased to operate in consciousness: in other words, we have a revivable system of ideas, or of dispositions that arouse ideas.

Consider, for example, a *plan* of action, mentally conceived. It is capable of being long held, revived at pleasure, and adapted to varying circumstances. In such a case, whatever detailed ideas or images occur in consciousness are only details or factors in one total mental attitude towards some end or ideal proposed in the "plan." The apprehension of the whole is prior to that of the parts and gives them their meaning. We must observe that this involves conation as well as ideation (see above, pp. 215-216). In this sense, "knowing involves willing"; we have a union of "meaning" as the attainment of insight, and "meaning" as the fulfilment of endeavour, even of desire and hope.

Dr. McDougall (who in all essentials is in agreement with Dr. Stout here) has given an effective illustration of this process in connection with *classification*. "Instead of having a separate name and a separate mental disposition for every class of objects which are essentially similar (or the same, so far as they concern our practical needs), we have names and mental systems corresponding to larger classes of members which resemble one another in less obvious respects. In this way, for example, primitive man's rough classification of the animal world has been refined by the discovery of a multitude of "homologies" (as between the arm of a man, the foreleg of a quadruped, and the wing of a bird) until the present scientific classification has been evolved."¹ Hence we see the importance of the distinction pointed out above (p. 123) between "reproduction by similars" and "reproduction of similars." Reproduction by similars merely brings back in succession two things already associated in the mind; reproduction of similars brings together things not previously thought of together. This is "the main instrument of scientific discovery, the essence of all that can be called reasoning, and the soul of poetry: an essential part of all the higher operations of the mind."

In the *Manual of Psychology* the apprehension of "form" is concisely discussed (pp. 132-133); and it is pointed out that even in the most primitive experience the awareness of

¹ *Outline of Psychology*, Seventh Edition, pp. 377-378.

complex unities would seem to be present: "Change is attended to before the specific character of that which changes is discerned, and responses are determined more by the perception of relations than by a definite perception of the terms related." This has been thoroughly exemplified by the experiments of the *Gestalt* psychologists (p. 133; see also the Appendix to the fifth edition, with Supplementary Note, pp. 655 ff.). Dr. Stout's *Manual of Psychology* was first published in 1898; the third edition was published in 1913, and the fourth (revised, in collaboration with the author, by Mr. C. A. Mace) in 1924. The only change in the fifth edition is the addition of the Appendix, referred to above, by Dr. R. H. Thouless, on the *Gestalt* psychology, with a Supplementary Note by Dr. Stout, clarifying his own position in this subject.

The *Manual* is in the main an exposition of Genetic Psychology, tracing the various stages in the development of mind from its lowest to its highest levels. We have discussed the meaning of development (as the term, is required in psychology) in Chap. XVI. of this *Groundwork*. In this treatment of the subject it is especially important to remember that psychology is not accurately defined as "the science of mind," but as "the science of mental processes or states"; and the only possible point of departure lies in the definition of mind as conscious individuality. No one can deal with mental processes or states without reference to their being processes or states of some conscious individual, some "I" or "self."

The student will observe that in the *Manual* the term "object," in the sense of psychological object, is used in the sense explained in the *Groundwork* (Chap. I.). The term "presentation," which was used in the 3rd edition of the *Manual* to cover sensation, mental imagery, and an imageless type found in trains of thought, is now abandoned; its use did not appear to be necessary.

The statement of the general and fundamental relations between cognition, feeling, and conation in the *Groundwork* (p. 17), led some students to anticipate a further departure from the usual threefold division of conscious processes; but

in the *Manual*, under the head of "General Analysis" (Bk. I.), we find that this is not the case. They are "Ultimate modes of the relation of the conscious subject to its object" (Chap. I.). The fundamental modes of the relation are three—cognitive, active, and affective. The cognitive attitude involves either judgment, or doubt, or mere "supposal." The affective or feeling attitude is described so as to exclude the possibility of "neutral" feelings. The conative attitude is kept more distinct from that of feeling, though their intimate connection is emphasised. These three are all "modes" of the general relation of subject to object, and this Dr. Stout calls "apprehension"; which is not to be identified with cognition (p. 101). The fundamental processes described under this head ("General Analysis") are sensation, imagery, imageless thought, attention, retentiveness, and finally "practical conative activity" (Chaps. II. to V.): and in each case preliminary statements of the "ascending levels" of the process are given.

The genetic exposition rests on the distinction of three ascending levels in the development of mental life. This conception is of fundamental importance. At each new "level" new processes and capacities emerge, which are dependent on those of the lower level only in the sense that the latter must have preceded them. We find, in the first place, sentience and its development into distinguishable sensations and images (Bk. I., Chap. II., and Bk. II.); in the second place the development of perception or perceptual consciousness, (a) learning by experience at the perceptual level (including two groups of factors, instinct and imitation), and (b) development of the perception of the external world with its spatial and temporal qualities (Bk. III.); in the third place, the development of ideational and conceptional processes, including memory, free imagination, conception, and language (Bk. IV.). Here two special problems arise: the external world as *ideal construction*, and the self as *ideally apprehended*. The phrases italicised should not cause difficulty. The problem at issue, as Mr. Mace observes (Preface, p. xi.), "is not that of the nature of space, time, and the material world, but that of our knowledge of these things. . . . We directly apprehend

only fragments of the material world, and fragments of space and time; our knowledge of what we do not directly apprehend is reached only through ideational activity," that is, by a process of "ideal construction." Similarly our "idea of the self," which embraces past and future states, is not immediately given, but is reached through ideational activity.

With regard to the development of spatial perception, the psychological problem is *not* to attempt to explain how spatial perception arises "from" or "out of" some kind of perceptual consciousness which had no spatial quality of any kind about it, as expressed in John Stuart Mill's conclusion that "our idea (perception) of space is at bottom one of time." That is not to explain space-perception, but to explain it away. The psychological problem is to inquire how spatial perception develops from vague and imperfect to more definite and perfect forms. This is the real and the only problem for the genetic psychology of space-perception: "the only problem," because in the end we have to come back upon the fact, of which no further explanation can be given, that the intelligent mind is able to perceive a spatial world; "the real problem," because the intelligent mind gradually comes to perceive a spatial world more widely and in greater detail, and we may fairly ask under what conditions this takes place.

At each of the three levels, the effective and conative factors can be distinguished (Bk. I., Chap. V., "Conative Activity" and its "Ascending Levels"; Bk. III., Chap. V., "Affective Tone of Perceptual Processes," and Bk. IV., Chaps. VIII. and IX., "The Affective Tone of Ideas" and "Voluntary Decision").

Moreover, at each level we can trace the factor which the author describes as "Meaning," based on the primary mental capacity of Retentiveness (Bk. I., Chap. IV., "Retentiveness"; Bk. III., Part I., Chap. I., "Reproduction in Perceptual Processes," and Part II., Chap. I., "Original and Acquired Meaning"; Bk. IV., throughout). We never have absolutely "pure" sensation, that is, sensation absolutely devoid of meaning, original or acquired. "To a very large extent the meaning conveyed by sensations is acquired through retentiveness and association; but it would seem that it cannot

be entirely acquired in this way. Derivative meaning ultimately pre-supposes original meaning which cannot be accounted for by retentiveness and association. . . . We may even go further than this, and lay it down as a general principle that sensations always have derivative meaning; for retentiveness and association operate from the very beginning of mental life. It may be urged that this cannot be the case in the earliest moment of experience. But even if we set aside what may perhaps be due to the results of ancestral experience transmitted by heredity, we have to recognise that the first instant of conscious life is only an ideal limit, which we cannot definitely mark off so as to consider it separately. Thus, even from this point of view, the conception of absolutely pure sensation is an artificial abstraction. No actual sensation with which we can definitely deal is absolutely dissociated from past experience" (pp. 124-25).

These considerations prepare the way for Dr. Stout's doctrine that Thought (with its categories) is involved in all Perception. Sensations perform a function which another writer described as "notificant"; they are mental, but they make us apprehend, or they always mean or carry with them the thought of, objects which are not mental, or at any rate not "my-mental"; and they can perform this function only because of a necessity lying in the mind's own nature to think in certain ways. This activity of thought has its "cue" given it by sensation, but it is not itself a sensory process. Even perception, therefore, is much more than merely sensory.

The following quotations from the third edition of the *Manual* throw light on what is said in Bk. III., Part II., Chap. I., in the fourth edition. "The apprehension or immediate experience in the way of sensation carries with it the apprehension of objects which are not immediately experienced—objects which are thought of as having a being independently of what passes in our mind in the moment of our becoming cognisant of them." Thus, "in being aware of a pressure-sensation we are also cognisant of something which presses." "The apprehension of resemblances, differences, successions and coexistences in the external world is essentially *conditioned* by the apprehension of resemblances, differences, successions

and coexistences among sensations." "The simplest datum of sense-perception from which the cognition of an external world can develop consists not merely in a sense-presentation but in a sense-presentation apprehended as *conditioned by* something other than itself." In the fourth and fifth editions the phrase "conditioned by" is withdrawn, and the relation is expressed by saying that the sense-presentation is apprehended as "an inseparable phase" of something other than itself. Mr. Mace (*Manual*, 5th edn., Preface, p. vii.) has observed that the relation is probably quite unique and must ultimately just be "seen." "When I strike a match in the dark, there are two facts of which I am reasonably certain: that I have a sensuous experience, and . . . that I have an experience in which *it appears that something is alight*." Between the sensuous experience and the appearing of something to be alight there is an important relation. It is not a relation of *identity*; it is more than a merely empirical concomitance or sequence; it is not one of causation—"my awareness that 'something is alight' is not reached by any ordinary kind of inference." The conclusion drawn by Mr. Mace appears to be essentially sound: it is a relation *sui generis*. Further development of this question leads directly into philosophy, and, in particular, into the "epistemological" problems arising out of sense-perception.

As regards conative activity, the difference (as far as there is any difference) between Dr. Stout and Dr. McDougall is one of terminology. "I believe the latter to be correct," says Mr. Mace, "in citing Dr. Stout as one of the most able and consistent exponents of the doctrine of conation which Professor McDougall has done so much to develop" (Preface, p. x.). We must add that the dependence of feeling on conation—in Dr. Stout's analysis—is not a "one-sided" dependence; it does not imply a factual priority of conation; the dependence is mutual. Nor does it imply independence of cognition. Success or failure of conation determines feeling and the discernment of the success or failure determines further feeling: and, so far, feeling depends on cognition. The processes show—to employ a metaphor from mathematics—a "cyclic order."

We have not done more than erect, as it were, a "guide-post" to the course of treatment in the *Manual*, in order to show what is the general nature of mental development as expounded by an extremely competent author. It has been said that the *Manual* should rather be described as "Prolegomena to Psychology." What ever truth this comment contains simply points to the fact that Psychology is a growing science, and what it needs above all is just that investigation of fundamental principles which Dr. Stout has carried through in the two works reviewed in this chapter. It is because many writers have either avoided such investigation or done it in a superficial way, that recent psychology presents an appearance of unutterable confusion. Some psychologists have tried persistently to "eat their cake and have it"; they have not accepted to the full the implications of their claim that the subject is a science; they have not been content with special and restricted hypotheses for special regions of fact; they have tried to combine the duties of science with the pleasures of prophesying at large about all kinds of human interests. We may believe, however, that the appearance of "unutterable confusion," among students of the subject itself (as distinguished from its applications)—so far as it is more than mere appearance—is only a temporary phase in a growing science which has by no means become a "science" in the sense in which Chemistry or Physics is a "science."

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